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**MAN: THE VERDICT
OF SCIENCE**

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MAN: THE VERDICT OF SCIENCE

SCIENCE AND SUPERSTITION

By

G. N. RIDLEY

Author of Man Studies Life, etc.

LONDON:

WATTS & CO.,

5 & 6 JOHNSON'S COURT, FLEET STREET, E.C.4

First published 1946



THIS BOOK IS PRODUCED IN COMPLETE
CONFORMITY WITH THE
AUTHORIZED ECONOMY STANDARDS

Printed and Published in Great Britain by C. A. Watts & Co. Limited,
5 & 6 Johnson's Court, Fleet Street, London, E.C.4

“The only evidence of value in science, and the only testimony which a student of science is competent to give, is that derived from his own observations. Hearsay evidence is not admitted in a court of law or given any weight in a scientific discussion, even when the informant is a clergyman of blameless character. A witness is expected to give a truthful account of the facts of a case as they presented themselves to him; and at the tribunal of science he dare not offer false testimony. His observations must be exact if they are to stand the test of cross-examination; his evidence must be impartial if it is to have any weight; and his loyalty should be to truth alone, as understood by him, if it is to influence the verdict.

“But the scientific man is a judge as well as a witness; his own investigations provide him with the evidence upon which he himself passes judgment; and when he is asked to accept conclusions or subscribe to convictions in support of which no facts are forthcoming, he declines to derogate his reason to his desire.”

SIR RICHARD A. GREGORY
(*Discovery*: Macmillan).



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CHAPTER ONE

SOME FIRST THOUGHTS

MAN once crept naked upon the earth, guided by his simple animal instincts among the manifold dangers that day and night threatened his existence. He searched for nuts and fruit to satisfy the hunger of his body, and feared only those things which could not be mastered by two strong hands or a blow from a club or stone. . . .

In some such humble way *Homo sapiens* began his long, adventurous career, passing with slow, laborious steps from a creature of brute cunning to modern man with power to modify his environment, with leisure in which to speculate on the nature, origin, and destiny of his kind.

Man's capacity for reflection, for abstract and creative thought, has been utilized for some thousands of years in the task of attempting to explore human nature and to build up some kind of comprehensive picture of human life: its components and controlling factors, its place in the Universe. The attempt has proceeded with many conflicting results, with the emergence of opposing viewpoints; and, despite its intrinsic nobility of purpose, it has called forth too often the worst features of man's nature: cruelty, jealousy, intolerance, and hate.

Homo sapiens has become an object of study, like rocks, climate, animals, bacteria, and food. We have only to cast an eye along the ranks of men and women whose lives are devoted to the scrutiny of some characteristic of his being to realize that the nature of man, including all that has sprung from it during his tenancy of this earth, is of an order of complexity that may appal the most stout-hearted thinker.

No doubt this very complexity of man's nature arises from the fact that when a man studies the

human organism, he is studying himself. Unable to detach himself wholly from the object of his inquiry, as he can so easily do when he investigates, say, the chemical composition of an egg or the life-history of an insect, he inevitably invests human characteristics with certain attributes which, for him, possess values, and for which he therefore has a personal regard. Thus it has come about that man and all his works, his failures and strivings, have for a thousand years been in turn analysed, described, criticized, praised, and condemned.

There is no side to man's nature that is not of some interest to somebody at some time. Our ways of life are such as to force us into daily contacts with our fellow men and women. Those contacts have an "interest" for each one of us, perhaps in some obvious, perhaps in some devious and scarcely recognizable way.

It is practically impossible to lead a normal intelligent life without witnessing the vagaries of human motives and actions, the conflicts of desires and ambitions, the queer and often horrifying departures from physical and mental normality, the expressions and consequences of religious beliefs and convictions. All these and many more are aspects of man's nature to be approached not in any sentimental, casual mood, but in a spirit of serious inquiry backed by knowledge, unhindered by passion or intolerance.

To the forthright question "What is Man?" there have been many answers. A little more than a hundred years ago the great zoologist Georges Cuvier answered it by saying that man is "a mammiferous animal having two hands." Recently Dr. W. R. Matthews, Dean of St. Paul's (*What is Man?*, 1940), has stated his belief that "man is a child of God, created to enjoy the vision of God and to become like God."

Neither definition leaves us with any feeling of satisfaction. They are based upon completely opposite viewpoints. The first goes no further than plain

fact, the second is based upon *belief*. We shall see in the pages that follow how the whole inquiry into man has been built up on a subtle blend of fact and belief. It will be no small part of our task to try to disentangle and distinguish between them as far as we are able.

Although man has shown himself capable of mental and physical activities far beyond the powers of any other organism, he still remains an animal species with certain pronounced affinities with other lowlier creatures. The ancient Greeks saw no reason to exclude man from the multitude of living things which they saw about them. Aristotle brought man within his scheme embracing the known animals and plants of his time. Many centuries later Linnæus (1707-1778) published his *Systema Naturæ* (1735), in which he included man among the animals. In the first edition of his work man goes into the Quadrupeds in company with the Ape and Sloth. In a later edition he distinguished the four different races or varieties of man, calling them Americanus, Europæus, Asiaticus, and Afer.

Buffon, the French naturalist and contemporary of Linnæus, also placed man in the animal kingdom, and was bold enough to express the view that man and ape might possess a common ancestor. This, however, was too much for the religious authorities in France, who compelled Buffon to withdraw or modify his heretical statements. Linnæus, the Swedish naturalist, experienced no such opposition to his classification of the human species.

Man's position in the animal kingdom has been precisely stated by zoologists. He is placed in the highest group of all—namely, the *vertebrates* or animals with a backbone. He is classed as a *mammal* because his young are born and fed on milk, like those of rabbits, whales, and mice. He is, moreover, a member of the highest group of mammals—the *Primates*—which includes the monkeys and apes. The primates are divisible into separate categories, of

which the highest is the genus *Homo*. As we shall see in Chapter Five, some types of prehistoric man have been recognized as belonging to this genus, but only modern man belongs to the species *Homo sapiens*.

Here the story of man's essentially animal nature, of the structure of his body, and of his origin through evolution is concisely expressed; for the mere fact that man can be so classified along with a great variety of other organisms superficially so very different from him, is strong evidence in support of the claim that he is descended from non-human ancestors.

Such a classification of man is a convenience, but it relates to only a tiny facet of his nature. We must go farther afield. A broad study of man must embrace the several aspects of his being—anatomical and physiological characteristics of his body, mental activities, and social habits. It should include the recognition of his dependence on nature.

We are in possession of an enormous amount of knowledge concerning the human organism and its manifold activities. This has been acquired by slow degrees in face of difficulties not always easy for us to appreciate. Therefore a comprehensive study of man such as we are proposing to outline in this book must have its historical background, in which may be seen the first stirrings of curiosity, of creative interest and reason, and of man's faith in his ability to guide mankind towards a fuller enjoyment of life.

Each specialization, too, has its own story of vague and tentative beginnings, of enlarging ideas, and the genesis of new hopes and aims. Each has provided a path along which men have been able to plod towards a better understanding of the human organism.

Anatomy, physiology, biology, psychology, and sociology are specialities of science which represent the principal lines of approach to man. Although they still stand for separate categories of thought and purpose, the old intellectual barriers between them are slowly crumbling away. The anatomist turns to

biology for a wider view of his study of the human frame; so, too, the physiologist. The psychologist can make but little headway until he turns to biology and physiology. And the sociologist cannot attain a clear understanding of man's social life if he ignores the psychological, physiological, and biological characteristics of man.

Within this close-knit system of man-centred studies we have, furthermore, to recognize the special interests of the economist, the student of mental diseases, the theologian, the philosopher, the pathologist, the criminologist, the eugenicist, and even of the chemist and the physicist.

Here, then, is an indication of the scope of the subject dealt with in the following pages. It is clearly one which can be considered in the first instance only under a number of arbitrary divisions. Five such divisions or parts suggest themselves as most suitable for our purpose. Cross references from one part to another occur from time to time. They will help to remind us of the fundamental unity of the several aspects of man.

Under the heading of "Questing Man" we shall trace out the course of man's struggle to achieve a reasoned approach to nature and human life. We shall see how mankind has benefited from the application of humanitarian principles which themselves have inspired men with the desire to study the human organism more closely and more objectively.

The heading "Organic Man" suggests a survey of advances made in our understanding of the evolution of *Homo sapiens*, of the structure and functioning of his physical body.

Some lines of approach to the problems of mind are discussed in connection with "Mental Man." Certain relations between mental activity, behaviour, and brain physiology will be brought into view. The opportunity will be taken to refer to some types of phenomena that are at present described as "super-normal," or by some people as "supernatural."

In the section entitled "Social Man" there will be discussed the growth of ideas about the structure of Society, about group or mass activities, and how the working of the body and mind can affect these activities on a large scale.

Finally, under "Man in Nature" we shall gain a glimpse of the human organism as a part of an all-embracing system of organic change, conflict, and co-operation. The significance of religion in man's consciousness of his relatedness to nature and the Universe is noted, and its future forms and operations are suggested.

Since it is our business in this book to make, however diffidently, an assessment of the value of man's intellectual achievements and of his mastery over the social, physical, and biological forces in his surroundings, let us first briefly consider some of the ways in which men build up their knowledge of the external world, and some of the influences which help to mould their ideas.

PART ONE

QUESTING MAN

Slowly and painfully, but none the less surely, mankind has been fulfilling a creative mission in evolving out of a welter of blind instincts a "kingdom of ends"—an organized life-scheme centred on a supreme good comprising truth, beauty, and righteousness, the three in one.—R. R. MARETT.

CHAPTER TWO

THE APPROACH

ONE is bewildered by the diversity of opinion and theory which men of science, philosophers, and others have expressed with regard to man and his affairs. There seems to be no common basis from which a comprehensive study of man can proceed. Beliefs and convictions firmly held and vigorously defended by one group of people are rejected as illusions by another. We had the grand example of this in the antagonism which occurred in the nineteenth century between religion and science.

On smaller matters the conflict of thought is still very general. Huxley and Haldane dismiss the idea of design in nature as an illusion; C. E. Raven, in company with other theologians, considers that the idea is a better one than that which sees the phenomena of animate nature as the results of blind, automatic, and haphazard forces. Yerbury Dent rejects the operation of free-will in human behaviour; William McDougall accepts it. One man will believe in personal survival after death; another will not, and so on.

Confronted by these and many more conflicting beliefs and points of view, the ordinary man may well be at a loss to know how to start thinking things out

for himself. To begin this process he should distinguish as sharply as possible between the *outside* world of seen and known things and events, and the *inside* world of his own thoughts and feelings. The first may be called the *objective* world, the second the *subjective* world.

In everyday thinking we do not trouble to distinguish one from the other. If we did, life would become a laborious and burdensome business. But when we deliberately set ourselves to thrash out some problem of experience, and to arrive at some satisfying conclusion concerning its nature, or origin, or meaning, then progress is possible only if we distinguish between what is *known objectively* and what is *felt or believed subjectively*.

The function of science has been to study objectively all natural phenomena—i.e., objects and processes external to the observer, and existing or taking place independently of him. One of the aims of philosophy has been to relate such phenomena to the subjective or inner feelings, emotions, and desires of the observer.

Man, in all his manifold aspects—bodily, mental, social, and “spiritual”—is commonly regarded through a confusing haze of scientific and philosophical concepts. It is no easy matter to disentangle them, to assess their relative values. Yet this must be done if man is to be studied rationally.

The successful progress of science has tended to emphasize the importance of an objective view of nature and to minimize that of the subjective. A materialistic attitude towards man has, until recently, dominated the scene. To-day there are signs of a reaction to this attitude, and we ought to take due cognizance of it.¹

¹ This has derived support from recent developments in physical science which have revealed the inadequacy of some of the older mechanical laws of nature and the non-material basis of matter. Both of these departures from established theories have been eagerly seized upon by many theistic writers to defend the claims of Christianity, and to condemn materialism and the “new paganism.”

Many thinkers have expressed a profound dissatisfaction and sense of alarm at the way in which man is being measured and analysed against purely materialistic standards, his society ordered on and governed by a-moral, scientific criteria. The present condition of world chaos, they affirm, is the result of our thinking too much in terms of the physiological man, and not enough of the spiritual.

In a study of man our aim should be to achieve, to the best of our ability, a right appreciation of the sources of objective and subjective habits of thought. In dealing with the latter, the influence of early training and experience ought to be carefully assessed. From childhood we are subjected to the impact of ready-made, traditional ideas, mostly of a religious character. Year after year the young and plastic mind is bombarded with impressions of other people's conduct, beliefs, fears, and inhibitions. It is no wonder that at maturity we find it hard to discover our bearings in a world of conflicts and bewildering controversy. With stereotyped ideas about man and God firmly rooted in our minds, it needs courage to dig them out, to look squarely at them, and to decide just what value we are to place upon them.

The angle from which we approach the study of man depends on the kind of people we are individually, on temperament, education, and the circumstances surrounding our lives. The philosopher, the biologist, the artist, the historian, the poet, psychologist, economist, the cynic, and the idealist, each has his own way of regarding man's nature, coloured by personal and specific interests, beliefs, and hopes. It is true to say that no two people view man in precisely the same light.

Although there is a common outlook on some matters, there is a wide divergence of feeling and opinion on others. Thus it is generally accepted that the human body functions in a manner similar to that of a rabbit or an ape. It would also be agreed that after death the body, like that of an animal or plant,

decays.¹ No one would dispute the observed fact that certain drugs have a definite action on the brain, intensifying mental processes, or abolishing volition and consciousness. Such a list of examples could be continued indefinitely. They are all in the nature of established facts of objective experience.

But it seems that the human intellect cannot rest content for long with such simple statements of truth. It must probe farther. And if the senses fail to supply what it needs—that is, if science, for a time, has nothing more to say—then personal sentiments and faiths are brought in until some new pronouncement by science renders them superfluous.

Technical improvements have the effect of shifting the limits of inquiry, so that with the passage of time subjective notions are gradually displaced by objective facts. A case which well illustrates this is to be found in the ban on the marriage of close relations. A long time ago marriage between members of a family was observed to produce frequently abnormal offspring, and these were regarded as a sign of God's displeasure at the practice. It therefore became illegal in the eyes of the Church and the State for near relatives to mate. When, many centuries later, science had devised methods by which to study how children inherited their characteristics from their parents, the whole matter was put on an entirely new foundation—a foundation of fact that effectively removed it from association with the irrational beliefs that people had formerly entertained concerning God's feelings on the subject.

While science has told us much about man, there

¹ Even this may be disputed by some. *The Universe*, March 9, 1945, reports that the body of a young Spaniard, Francis Luiz Perez Miravete, who was shot in 1936, was exhumed in 1940 and "found to be incorrupt, with blood coming from the wound." There are other cases on record of alleged incorruption after death. Until such bodies can be submitted to long laboratory tests by physiologists no scientific explanation of the phenomenon can be expected (see Chapter Nineteen).

are still—and probably always will be—many blank patches in the picture to vex our questing minds. It is so easy to fill in the missing parts from the unlimited resources of the imagination that it is not to be wondered at that few men do not succumb to the temptation at some time in their lives.

The inherent incompleteness of scientific interpretation is precisely the point at which the scientific spirit is most open to attack by those who distrust its modern trends and fear its influence. It has reduced the human organism to the status of a machine operating in accordance with certain well-known principles of physics and chemistry; it has given man mastery over natural forces; it has examined in astonishing detail practically all the major phenomena of life; it has put tools, instruments, and weapons into the hands of mankind. Yet it has nothing to say about fundamental causes; it leaves us ignorant of the answer to the final question: Why?

The theologians and philosophers are, not unnaturally, critical of the manifest shortcomings of a branch of thought the claims and aims of which have been so persistently, almost arrogantly, publicized. Science rejects God, they say, but has nothing to put in His place. It has set out to lead the people towards a new world of reason and substantial benefits, but has provided nothing more than a hollow, distorted, and chaotic conception of life without purpose or hope. Each mystery solved serves only to reveal a hundred more. Only bring in the wisdom and goodness of God, it is urged, and you have an explanation for everything. . . .¹

A balanced view of man must include both objective and subjective elements of thought. The real task before the thinker is to decide, in the light of past and

¹ "It is very rash to erect a theological superstructure upon a piece of ignorance which may be only momentary. And the effects of this procedure, so far as it has any, are necessarily bad, since they make men hope that new discoveries will not be made."—Bertrand Russell: *The Scientific Outlook*, p. 111.

present examples and circumstances, the degree to which subjective speculation shall be allowed to enter into his analysis of man's nature.

The scientist at work in his laboratory or in the dissecting-room resolutely eliminates personal feelings and wishes from the conduct of his experiments. In his capacity of investigator of objects and processes external to himself, he is content to observe, measure, and record. Removed later from the atmosphere of research, the scientist may give himself up to the quiet contemplation of the larger significance of what he has observed; may bring, in the mind's eye, the results of his studies into some sort of relationship with the findings in other fields of inquiry, be they scientific or otherwise.

Indeed, it is by objective study and abstract thought that the great generalizations or principles governing natural events are formulated. Such work entails a proper appreciation of the validity of subjective data. Dr. C. E. Raven (*Science, Religion, and the Future*, 1943) has pointed out that the so-called objectivity of the observer and measurer is interwoven with subjective factors. The scientist, in studying external phenomena, uses instruments and tools, and in deriving information from them, he employs his mental processes of reasoning in just the same way as the philosopher and theologian and mystic form their specific concepts of what, to them, is reality.

Raven further observes that if the present "objectivity and finality" of scientific knowledge were to be discredited, it would not mean that such knowledge loses its validity or usefulness for human purposes. He writes:—

"What has happened is that probability here as in other fields takes the place of certainty; laws become hypotheses and infallibilities disappear for science as they ought to have done for theology."

A prerequisite in the study of man is the firm

rejection of all notions of the greatness and magnificence of the human species which are based upon conceit. Religion has played, and still plays, a big part in fostering unwarrantable beliefs in regard to man's supposed heaven-sent gifts, his election to be the instrument of the Divine Will, and his special dearness to God. Such beliefs as these, when viewed against the background of man's record of bestiality, cupidity, and demoniac cruelty towards his fellows, seem fantastically naïve and childish.

The most we can reasonably assert is that man stands highest in the scale of animal life. To go beyond that is merely wishful thinking; and until intelligent men and women become more critical of their acquired beliefs, and are prepared to question their probity rationally and in the light of what we *know* of man's record, instead of what we *would like it to be*, we shall not attain to that full sense of responsibility for which there was never a more urgent demand than there is to-day.

Our natural conceit is responsible for much confused and barren thinking about the nature and destiny of man. It has been at once a spur and a stumbling-block to many lofty aims. The records of men's thoughts and activities in the Middle Ages, under the tutelage of the Church, cannot provide us with any substantial evidence of a less egotistical tendency of mind than may be discerned in modern times. Man, to-day, may, as D. R. Davies (*Secular Illusion or Christian Realism*, 1942) asserts, be "intoxicated with the sense of his own creative power." In medieval times he was delirious with the belief that he was the instrument of God's will, and in that capacity was prepared to root out the devil of free-thought from the human mind.

It is necessary that we should approach the study of man with due recognition of his relative immaturity, and of the limitations inherent in our own mental capacities. It is necessary for us to see man not solely in his present being, but also in his past becom-

ing; to recognize, without fear or disgust, the ruder elements, relics of a brutal ancestry, in his physiological and psychological make-up.

Judged by geological and biological standards of time, man is a comparative new-comer to this earth. Against the tens of millions of years that have elapsed since a miserable pin's head of nerve-cells began to evolve into the human brain, we place no more than a mere 500,000 years or so as the brief period during which a recognizably human organism has inhabited this world. For the growth of civilization in Asia, in northern and western Europe, we can reckon six or seven thousand years.

In this short time we have accumulated a vast store of knowledge concerning nature and the human species. With the best intentions, we have profoundly modified the conditions of life of *Homo sapiens*, and in so doing we have produced a crop of specifically human problems and difficulties.

The primary method of approach to any problem of our world is the scientific one. It may or may not involve the use of scientific tools. The simple process of *observation* is the beginning of all inquiry and analysis. The extent to which such inquiry is later developed depends on the techniques which man's ingenuity can devise.

In the general sense of the term, science signifies a specific attitude of mind towards external phenomena, plus a system of knowledge which has grown out of that attitude. To quote the editorial words prefacing *Human Affairs* (1937):—

“ Science is not a device for making self-filling fountain-pens. Science unveils a new universe of possibilities; it creates a new order of values; it demands another way of living. . . . For there is an intrinsic beauty in the architecture of scientific thought, an intrinsic worth in acquiring its realistic type of thinking, a superb ethical discipline in the impersonal quality of its ends.

To spread the scientific spirit in the community is a need of the first importance."

Our understanding of man has emerged from the applications of science, and the exercise of speculative and creative thought. The interplay of these methods of approach will be demonstrated in other parts of this book.

Not many decades ago, the use of the term "science" was claimed and rather jealously guarded by the votaries of the old-established departments of learning such as chemistry, physics, astronomy, and mathematics. The techniques by which these subjects were enlarged involved the use of instruments of diverse kinds, of planned experiments and dispassionate thought. Nothing was taken for granted, no idea accepted as true unless supported by sound evidence. Biology remained for centuries a descriptive subject. In due course the experimental approach to its problems opened up a new world of possibilities. Biology became a science in the accepted meaning of the term.¹

The claims of other branches of study concerned with man, such as psychology, sociology, and history, to be recognized as sciences have been much debated in recent years. While psychology has, in virtue of its modern methods, been accorded scientific status, sociology has not been so successful in this respect, for it is still largely descriptive and speculative. Sociologists themselves, however, claim that they conduct their researches on essentially scientific lines, for they, like other investigators of objective phenomena, set out to collect and to analyse facts, to prepare explanations or interpretations of them, and to attempt to frame laws and generalizations covering human relationships.

Sociologists cannot conduct controlled experiments. They cannot, for instance, arrange to have one group

¹ This topic is more fully dealt with in my *Man Studies Life*; Watts, 1944.

of individuals living under one deliberately selected set of social conditions, and another identical group under some other set. Individuals themselves vary enormously, and it is not possible to isolate a single factor from the social environment so as to determine its specific influence on a community.

History, for obvious reasons, cannot properly be designated a science. The evidence on which its concepts are based is of a documentary and, therefore, of an incomplete nature, leaving much scope for the play of individual bias in interpretation.

There are now no restrictions or penalties imposed by authority¹ on the rational, scientific approach to the problems of man's being. We are free to develop our individual ideas, to express our personal opinions, and in the pursuit of knowledge to turn to any source of information we choose.

Scientific method has been applied as much to the study of man as to that of the lower animals and plants and the physical and chemical aspects of the inanimate world. Although the phrase "science of man" is sometimes used, there is, at present, no compact and unified body of thought dealing with human characteristics *as a whole*. We study only the separate aspects of *Homo sapiens*.

The investigation of man is such a vast and complex business that it can be conducted only on a basis of specialization. One man devotes himself almost exclusively to the scrutiny of a small and seemingly insignificant facet of human life.

This approach has produced its own peculiar difficulties and pitfalls. The long and progressively deepening analysis of man has encouraged us to view him as a number of separate physical, chemical, and mental processes.

The correlation of these several parts in a compre-

¹ With the exception of the Roman Catholic Church, which directs its members to avoid reading certain kinds of books which contain opinions and ideas contrary to Roman Catholic doctrine.

hensive synthesis is a task of extreme difficulty, if only because we have as yet but an incomplete collection of them. Of this Alexis Carrel (*Man the Unknown*, 1936) has said:—

“Such a synthesis cannot be obtained by a simple round-table conference of the specialists. It requires the efforts of one man, not merely those of a group.”

It is manifestly beyond the capabilities of any one individual to study at first-hand all aspects of man's physical, mental, and social nature. At most, he may personally investigate a small fragment of his being, augmenting knowledge so acquired with material derived from the perusal of the records of other workers both in his own and other fields. A danger inherent in this procedure is that the student will be tempted to select those opinions and conclusions which harmonize most conveniently with his own, and to place emphasis on those ideas which most nearly accord with the results of his own experience.

CHAPTER THREE

THE ESCAPE TO REASON

THE free employment of reason in the approach to man is so vitally important to modern studies that it will be useful to outline the main phases in the growth of intellectual freedom in Western civilization, particularly in regard to the changing outlook on *Homo sapiens*.

The last few centuries have seen an upsurging of the will to reason, which has for all practical purposes completely overwhelmed the restricting influence of traditional, ecclesiastical dogmatism in the daily consideration and conduct of human affairs. It has crystallized into an intellectual outlook of a specific kind called *Rationalism*.

Rationalism denotes an attitude of mind towards the problems and phenomena of life and nature which refuses to accept unconditionally the dogmatic assertions of any self-appointed external authority, either in regard to religious beliefs or any other sphere of thought.

In pre-Christian times, when authority had not made its appearance in the intellectual sphere, there is evidence of a free approach to man as a part of nature. Among the Greeks there emerged the first recognizable signs of an inquiry into the nature and origin of the human species. They approached these matters with an objective eye uninfluenced by religious dogmas or traditions. The extension of sea and land routes in the course of exploration, and the expansion of trade in the ninth and eighth centuries B.C., brought men into contact with other lands and other races. The habits and social customs of these peoples were noted and recorded. To the Greek Herodotus (b. 484) is ascribed the first compilation of the types of

humanity; and by some modern scholars he is looked upon as the father of Anthropology.

The special creation of man was not a concept that entered into the speculations of the pre-Christian thinkers. They were more interested in the possibility of the evolution of man from an earlier, non-human form of life. The records of both Anaximander (610-547 B.C.) and Archelaus (c. 450 B.C.), philosophers of Miletus, an ancient city of Asia Minor, contain indications of an evolutionary approach to the genesis of the human race. Human life was seen to be but a part of animal life as a whole, and as such was regarded dispassionately and objectively.

The decline of the Greek and Roman Empires carried with it the virtual extinction of free thought, and this was not to make its reappearance in European civilization until the sixteenth century. The study of man was neglected. The rise to power of the Christian Church resulted in the suppression of attempts to diagnose man in terms of his membership of the animate world. The doctrine of man's unique relationship with the Creator automatically severed any blood-ties he may formerly have been believed to have with the lower creatures. He became a thing apart from natural phenomena, and beyond the blind operations of nature.

Throughout the Middle Ages the spirit of obscurantism, sustained by rigid theological dogmas, accustomed men's minds to the idea of the inherent sanctity of man's nature. The study and contemplation of man were sanctioned only in so far as they were likely to bring support to the doctrines of God's creative wisdom and beneficence, and of the immortality of the human soul.

But at the same time there were in fact many who, in their hearts, disputed the dogmatic assertions of the Church concerning the interpretations of natural phenomena and human experience. Few, however, were prepared to take the dangerous step of voicing their opinions, for the Inquisitors and

Ecclesiastical Courts kept a close watch upon all expressions of individual thought, both verbal and written, and were quick to arraign and condemn all whose activities they judged to be impious and heretical.

Roger Bacon (1214-1294), a Franciscan monk, directed his mind towards the problems of nature. In this Bacon was, according to some authorities, merely following the example of certain of his contemporaries. He was interested in the crude science of his day, and because of his experiments was accused of dealing in magic.

The Franciscan was shrewd, inquisitive, and argumentative. He was no mere dabbler in the occult. He realized, in the course of his studies, the possibility of man's acquisition of power over nature. He developed a contempt for the orthodox, stereotyped modes of thought which he experienced while in Paris and at Oxford. His stinging attacks on the philosophical writings of his contemporaries brought him ten years' imprisonment. While in prison, Bacon wrote his *Opus Majus*. Shortly after his release he produced (1271) the *Summary of Philosophical Study*. This displeased the Franciscan authorities, and he was confined to gaol for another fourteen years. It was his influence on popular thought that they chiefly feared, for Bacon would have none of the false reasoning of his time. "Think it out," he would have said, "use your own mind, argue, and experiment."

In the outlook of one Reginald Scot, scholar and gentleman of leisure of the sixteenth century, we can discern the clear stamp of rationalistic thought. Scot lived in an age when the belief in witchcraft dominated the social life of Europe. Demoniac possession was held to be the cause of all kinds of ills and distortions of body and mind. The witch worshipped Satan and carried out his evil designs, leading God-fearing people away from the Church. During three hundred years something like a quarter

of a million people were tortured, hanged, or burned after being "tried" in the witch-courts.

Scot, much to his own peril, wrote vigorously against the current belief in the machinations of witches. He urged that a *natural* explanation should be applied to the practice of witchcraft. In 1584 he published a book entitled *Discovery of Witchcraft*, in which he sought to direct the minds of judges, justices, and juries towards a humane and rational view of such imaginary, erroneous conceptions and novelties as demons, devils, spirits, and familiars. In the opening pages of his book, Scot referred to:—

"... things very necessary to be known for the preservation of poor, aged, deformed, ignorant people; frequently taken, arraigned, condemned and executed for Witches, when according to a right understanding, and a good conscience, Physick, Food and necessities should be administered to him."

Reginald Scot worked and wrote for humanity and the liberation of thought. His book, published in 1584, is, in the words of Russell Lowell:—

"... full of manly sense and spirit; above all, of a tender humanity that gives it a warmth which we miss in every other written on the same side."

Scot himself wrote in the dedication to Sir Roger Manwood:—

"I renounce all protection and despise all friendship that might serve towards the suppressing or supplanting of truth."

And addressing himself to his kinsman Sir Thomas Scot he said:—

"My greatest adversaries are young ignorance and old custom; for what folly soever tract of time hath fostered, it is so superstitiously pursued of some, as though no error could be acquainted with custom."

Reginald Scot was accused of being an Atheist, it being generally supposed that to seek for natural explanations in the face of scriptural teachings was equivalent to a denial of the existence of God. To us of a more enlightened age Scot's example shines out like a warm, comforting light in a gloomy world of fears and delusions.

A third pioneer of Rationalism to whom reference may be made is Isaac de la Peyrère, a Frenchman and Calvinist of Bordeaux, whom Stanley Casson (*The Discovery of Man*, 1939) portrays as a forerunner of Darwin and Huxley. From childhood Peyrère had rebelled against the dogma of the Church that Adam was the first man. In 1655 he published a book called *A Theological Systeme upon that Presupposition that Men were before Adam*.

As a result Peyrère was attacked by the Inquisition, and his book was burned in Paris. However, it evidently enjoyed a fair circulation, as about seventy years later it was said of it that:—

“the profane and impious book ought to have been put out of the way in eternal night. Now, printed in three ways, it has scarcely seen the light but in a moment has flown over the Christian world.”

The late Professor J. B. Bury (*A History of Freedom of Thought*, 1913) pointed to two significant periods in the growth and progress of Rationalism; the first in the seventeenth and eighteenth centuries, when many thinkers were constrained to criticize the inconsistencies and contradictions in Christian theology and the Scriptures; the second in the nineteenth century, when the development of science provided cogent grounds for the removal of authority and the exaltation of free-thought.

But the first tentative steps towards the deliverance of reason from bondage were taken in the thirteenth century in Italy. Men began to subject themselves and their relation to the world in which they lived to

thoughtful inquiry. They acquired a new curiosity about life.

The new outlook spread by degrees throughout Europe. The invention of printing in the fifteenth century facilitated the spread of knowledge. Travel and exploration brought to men a broadening interest in the continents and peoples of the world. At the same time education began to embrace a secular training as distinct from instruction in religious doctrines and precepts, devoted to the preparation of young people for life within the community.

Science began to shake itself free of its old mysticity and naïvety about the beginning of the seventeenth century. There grew in men's minds a love of truth for its own sake, a desire for that freedom of thought without which mind is but a barren encumbrance. The process was laborious and slow. Precursors there had been in the sixteenth century, men like Vesalius, Servetus, Copernicus, and Bruno in the fields of biological and astronomical science.

The beginnings of modern scientific thought are associated with the writings of Francis Bacon (1561-1626), English lawyer, statesman, and philosopher. Bacon urged the necessity for an objective, rational study of natural phenomena, of man's nature and place in the Universe. His plans and suggestions were embodied in two influential publications: *The Advancement of Learning* (1605) and *Novum Organum* (1620). In the latter work he wrote:—

“Man, as the minister and interpreter of Nature, does and understands as much as his observations on the Order of Nature, either with regard to things or the mind, permit him, and neither knows nor is capable of more.”

Despite the growing power of scientific methodology in the seventeenth century, there was as yet no fundamental rift between science and religion. Men of science like Boyle, Ray, and Newton were, as Dr.

C. E. Raven (*Science, Religion, and the Future*, 1943) remarks, as deeply concerned with theological problems as they were with the sciences to which they so richly contributed. The real split occurred in the nineteenth century. Meanwhile, many philosophers were content to acknowledge the Hand of God in the operation of the laws of nature which they had discovered. The more their studies revealed of the marvels of nature and the Universe, the greater was their reverence for the powers of the Creator.

If conflict there was prior to the nineteenth century, rather must it have been between theology and the interpretation which scientists and thinkers put upon natural events, than between theology and the act of scientific inquiry. So long as researchers did not attack in their writings the tenets of the orthodox Church, they were unmolested.

The Press Licensing Act was framed to prohibit the publication of books antagonistic to the Christian faith. Although it ceased to operate after 1695, it was still possible for legal proceedings to be taken against any person expressing atheistic views or other "damnable opinions." Some writers acquired a skill in writing against Church doctrine in such a way that they could not themselves be accused of heterodox beliefs. Many were Deists, believing in the existence of a God, but refusing to accept the Scriptures as the source of Divine revelation. For such people there existed an ever-present threat of persecution which long exercised a restraining influence upon the free expression of individual thought.

Nevertheless, the seventeenth century was notable for the work of two prominent philosophers: Thomas Hobbes (1588-1679), free-thinker and materialist, and John Locke (1632-1704), author of the *Essay on Human Understanding*. Both men worthily championed the cause of freedom of thought in a period in which men still believed in witchcraft and the doctrine that Adam was the first man.

With the long and arduous struggle between the

budding rationalistic outlook and the ecclesiastical obscurantism throughout the eighteenth and early nineteenth centuries we need not here concern ourselves. We shall see something of it in the course of the next chapter, in which the rise and influence of humanitarianism will be traced out; for it was based essentially on reason, and offered a certain impetus to the modern study of man.

Meanwhile, we may observe that it was in the nineteenth century that the ultimate victory of free-thought was gained over Christian dogmatism. The accumulated results of science in anthropology, geology, chemistry, physics, biology, and sociology constituted a serious challenge to the old belief in the infallibility of the Bible. They spurred on the revolt of the intellect against ready-made doctrines enforced by authority. In the relatively short space of some fifty years men acquired a new freedom of thought that had been denied them for fifteen centuries.

Before the close of that fascinating period, the nineteenth century, the way was cleared for an objective, scientific study of mankind. At least three important concepts touching upon *Homo sapiens* had been established. These were the antiquity of man; the descent of man and apes from a common stock; and the germ theory of disease. In addition, advances made by biologists in their studies of the development of the embryos of monkeys and man helped, in a minor degree, to prepare the ground for the break between the scientific and religious approaches to the problems of man's being.

For several centuries Natural Theology represented a combination of observations of nature with a fundamental belief in a personal God. The products of objective inquiry were made the building materials of doctrines of moral values, of order, purpose, and design throughout nature. Thus theological dogma was upheld, often by the most extravagant flights of imagination. The Bridgewater Treatises, published in the 'thirties of the last century, typified the outlook

of the clergy and many men of science on the phenomena of nature.

The publication of the Darwinian theory of evolution through natural selection in the second half of the nineteenth century dealt a blow at interpretations of life based on the belief in design, a blow more damaging than any which the earlier sceptical thinkers had been able to deliver. It gave an explanation, based on rational considerations, of how the diverse forms of animal and plant life, now to be found in every part of the world, could have come into being through the operation of blind natural forces, instead of under the direction of an omnipotent Creator.

The account of man's descent from a primitive ape-like stock raised a storm of bitter controversy. The upshot of it was that science and theology tacitly agreed to go their separate ways; theology to concern itself with ultimate things of the spirit, science with facts of observation and the explanations that reason alone was capable of deriving from them.

The establishment on a scientific basis by Pasteur and Koch of the fact that disease had a strictly materialistic, biological origin demolished the widespread belief that disease was a punishment inflicted upon erring mankind by a wrathful God. There is no evidence that any substantial opposition was aroused to this rational approach to the causation of human ills. For even the most pious supernaturalist would, no doubt, be glad in his physical suffering to avail himself of the benefits offered by science, if they could but delay the hour of his death.

The tendency of thought encouraged by nineteenth-century science was strenuously condemned from the pulpits, but without effect. Rationalism gathered momentum. It was a movement to which in this country Bradlaugh and Holyoake lent immense force and vitality.

Public opinion became more and more tolerant of individual freedom of thought. Knowledge, in a

cheap and attractive form, was brought within the reach of the people, an event against which the civil authorities had long fought by means of taxes on the Press. Freedom to use one's mind, and to express one's own opinions on fundamental concerns, was considered a dangerous thing if allowed to spread throughout the masses who, it was feared, might thereby lose their sense of reverence and respect for the pronouncements of their superiors on social and spiritual questions.

George Holyoake struggled successfully to secure the abolition of the crippling taxes levied on newspapers and other periodicals. He helped to found in 1899 the Rationalist Press Association, and was its first chairman until 1906. An influential society which has issued for close on half a century the works, in a cheap edition, of many accepted thinkers of the past and of present-day writers, the R.P.A. has played a notable part in the drive towards the encouragement and maintenance of free-thought in England and America, indeed throughout the world, with inestimable benefits to humanity.

To-day the influence of Rationalism is not confined exclusively to religious matters. It finds scope in social and political affairs. It is indicative of a subtle change which has entered into man's attitude towards the nature and potentialities of the human intellect.

Rationalism is often regarded by casual observers as another term for Agnosticism or Atheism. It is far from being so, even if many Rationalists are, in fact, unable to accept belief in the existence of a personal God. It is more than a synonym; it stands for a mental discipline which, when men have learned to accept and apply it, will have a profound influence for good upon the life of mankind.

It is worth noting that after having derided Rationalism for so long, members of the Protestant and Catholic Churches are now claiming to be the *real* Rationalists!

Reason exercised gave men a new sense of power and purpose. When that power was applied to the reshaping of society and moral standards, the possibilities of a constructive study of man began to show themselves. It is therefore to a brief consideration of the progress of "man's redemption of man" that we must now turn.

CHAPTER FOUR

THE NEW HUMANITY

THE study of man was in large measure dependent on the emergence of a fresh attitude towards the significance and potentialities of human life. The change began to show itself in the seventeenth century, although the germ from which it sprang was, as we have seen, striving for expression in the thoughts of a few precursors in the previous century.

The "new humanity," or humanitarianism, became an effective movement in the eighteenth century, representing a reaction against the manifestations and social consequences of the sufferings, the crippling ignorance, and the inhuman degradation of the poorer sections of the community. The mechanization of industry rendered the traditional techniques of individual craftsmanship superfluous, with the result that a great number of people were driven to spend their days in an environment totally different from that to which for centuries their families had been accustomed.

The prevalence of disease and abuses among the civil population, sea-faring men, and soldiers, as well as among the prisoners in gaols, eventually led to a determined effort on the part of a few sensitive and enlightened men to remove, or at least to mitigate, the evils that degraded and stultified humanity.

The advances of science stimulated further investigation into the causes of human diseases and afflictions. Even in the closing years of the seventeenth century we find the Italian physician Bernardino Ramazzini embarking on a study of the different diseases associated with various types of industrial work. About 1700 he published a book entitled *The Diseases of Artificers, which by Their Particular Callings They Are Most Liable to, with the Method*

of Avoiding Them, and Their Cure. In this pioneer study of occupational diseases Ramazzini dealt with some fifty different types, and drew attention to the materials used by, and the physical conditions of labour imposed upon, the workmen, as two factors responsible for their sufferings.

Work was continued in this field in the early years of the nineteenth century, when, about 1830, a Leeds surgeon named Turner Thackrah published the results of a long study which he had made of occupational diseases associated with no fewer than 250 branches of industry. It was the first piece of research of its kind to be undertaken in this country; and its author went farther than his immediate object by announcing that he believed it to be the duty of the State to devise suitable measures of prevention.

Thus the initiation and rise of preventive medicine are seen to represent one aspect of the development of a broad humanitarian doctrine. It was a step towards the freeing of mankind from those penalties which man's exploitation of natural resources inevitably brought down upon his own head.

The eighteenth century was a period of deep-seated revolution in intellectual and social affairs. Art flourished under Hogarth, Reynolds, and Gainsborough. Manners and conduct became more humanized. The emerging desire for freedom of thought and individual action gave to many energetic spirits the opportunity for raising the conditions of personal and communal life to new levels of happiness and productivity.

The impartial observer of life in England at this time would have been impressed and horrified by its contrasts. On the one side were wealth, dignity, and happy childhood; on the other, poverty, injustice, and the wretchedness of neglected youth. It was in the alleviation of the sufferings of the poor, the transgressors, the exploited under-dog, and the mentally deranged, that the energies of men like Wesley, Howard, Bentham, and Tuke were tirelessly expended.

To read of their constant endeavours, their kindness, and hope sustained in the face of overwhelming difficulties, is to glimpse something of the power that lies untapped in the human mind.

John Wesley, the founder of Methodism, lived from 1703 until 1791. Between 1735 and 1738 he lived in America; and it was after his return to England that he began his fifty years of travelling throughout the country, preaching and teaching, infusing a new interest and ideal into the minds of the people whom he addressed, in all walks of life.

His message, so fervently delivered, dealt not only with religion, but also with a new social doctrine. Wesley made the people aware of their individual responsibilities in respect to their personal habits and conduct, and to their membership of the community as a whole. "Christianity," declared Wesley, "is essentially a social religion." His influence was such as to awaken the human mind to a sense of self-respect, of diligence and sober ambition. Yet Wesley found it hard to ally himself with the sceptics who were beginning to speak of the belief in witchcraft as a species of madness. Witches were referred to in the Scriptures. Therefore, argued Wesley, to give up witchcraft was in effect to give up the Bible.

His booklet *Primitive Physic* was a great success, there being a call for no fewer than thirty-five editions. In it Wesley set out the simple rules of healthy living: abstinence, plain food, honest work, sleep, and exercise. But more important than these he rated the love of God, through which alone could serenity of mind be won. As Sir George Newman (*Health and Social Evolution*, 1931) tells us:—

"Wesley was not the last great leader of a nation to appreciate that the health of men, women, and children is dependent on other things than medication."

An influential contemporary of Wesley was John Howard. Born in Middlesex in 1726, Howard was

appointed High Sheriff of Bedfordshire in 1773. From that time he began an investigation of prisons in the British Isles, as well as in Europe and Russia. His extensive travels cost him the sum of £30,000. The outcome of his labours was the initiation of sanitary and penal reform in England and on the Continent. He wrote *The State of Prisons of England and Wales*.

Like Wesley's, Howard's efforts secured a change in the public attitude towards "those who are lowest." Out of his love for humanity there sprang the seeds of a new, rational religion. His sensitive mind was touched by the manifest brutality and unreasonableness of the Law, which punished the smallest offences by hanging; and the administration of which by callous magistrates and judges created the very conditions of social life most conducive to criminality. Those who were highest, enjoying comfortable positions of authority, did not concern themselves with the causes of lawlessness in the lower strata of society. To such people crime was an evil that could be stamped out only by ruthless punishment. We shall see in a later chapter how crime became a subject for scientific study.

John Howard died of typhus in Russia in the year 1790. At about the same time the treatment of the insane was revolutionized by the application of rational, humanitarian principles. In this connection we remember the names of Pinel and Tuke.

Philippe Pinel was born at St. Andre in 1745. As a physician he devoted himself to the study of mental diseases. At this time the mentally deranged confined in institutions were treated in an incredibly brutal fashion, bound to the walls of their cells by chains, clothed in rags, and beaten to subdue their cries of fury. Pinel visited asylums and saw for himself how badly the insane were cared for. In 1792 he became chief doctor of the Hospital Bicêtre in Paris, where he eventually brought about a complete change in the manner of handling the insane.

Pinel placed his views and convictions before the Common Council of Paris, which granted him permission to apply his revolutionary idea of kindness, instead of inhumanity, to the unfortunate inmates of the asylum. It was a memorable day in 1793 when the mentally sick were freed from their chains, brought into the light of day, given proper food and suitable occupations.

The experiment promised to fulfil the hopes which Pinel and his friends had set upon it. But the ignorant and fanatical mob element in Paris was stirred to violent action against the doctor, who, however, succeeded in escaping from an attack on his life.

Pinel's example had its influence in other countries. In England William Tuke (1732-1822) became interested in the care of the insane. Born in York of Quaker parents, Tuke entered the family business. In 1791, at the age of fifty-nine, he began his work for the better organization of lunatic asylums, enlisting on his side the services of the Society of Friends. In 1796 he founded the York Retreat, in which institution the inmates were treated in conformity with Tuke's humanitarian principles.

In the middle of the nineteenth century Miss Dorothea Dix worked for the introduction of Pinel's doctrines into the treatment of the insane in the United States of America.

In the eighteenth and nineteenth centuries the profound influence of the *environment* on human life and activity began to be recognized, both from the biological and the sociological angles. The industrialization of Europe brought out very clearly the ways in which the surroundings of men and women could affect their work, health, and happiness.

The environment of modern man is immeasurably more complex than that of any other organism. The relatively simple natural environment of his early ancestors in the Stone Age, has been greatly enlarged by the inclusion of secondary elements of human

origin. The natural or primary environment comprises the great forces of nature: climatic conditions, seasonal changes, winds, storms, floods, lightning, as well as plant and animal life in so far as this impinges upon man's aims and activities.

The evolution of culture has produced the secondary environment comprising many factors which have arisen from man's attempts to modify nature for his own purposes in his forward drive towards a richer and fuller life. Mechanical devices of every kind have reduced the physical exertions of a vast number of people, and at the same time have introduced excessive noise and vibration into daily life. The use and manufacture of chemicals in large quantities have added harmful and obnoxious compounds to the air. Soot, acid fumes, dusts, and the products of the combustion of liquid fuels pollute the atmosphere of towns and cities.

Conditions of social life have encouraged the multiplication and spread of pests and disease germs, and the use of alcohol and certain drugs. Speech and writing, and an ever-expanding system of communication in the form of newspapers, books, radio, theatre, film, and so forth, envelop the individual from his earliest and most impressionable years with psychological influences of every conceivable kind calculated to act upon his mind and judgment.

In the biological sphere, Buffon (1707-1788) had emphasized the possible influence on organic evolution of environmental factors such as climate and food-supply. Later, both Treviranus (1776-1837) and Lamarck (1744-1829) laid stress on the important part played by the environment in moulding the physical characteristics of living things. In the social and industrial spheres it fell in large measure to the lot of Robert Owen (1771-1858) to bring the biological idea into relation with the human organism.

The work and writings of Robert Owen have made men long esteem his memory. A successful business man and factory owner, Owen took practical steps

to raise the level of existence of his employees. Nurtured in the changing social atmosphere of the late eighteenth century, he saw about him ample evidence of the abuses to which human labour was subjected by employers in industry.

Owen's views on the value of human life cut right across those held by the majority of factory owners, and even by the clergy. With vigour he opposed the degrading and obstructive doctrine sustained by Christian theology that man's misfortunes, poverty, and sickness were due to his innate sinfulness. He urged that the material conditions under which men, women, and children lived should be studied and improved. He believed that people's characters were determined by the kind of surroundings, physical and moral, in which they grew up, lived, and worked. He set an example to other employers by giving thought to the health and general well-being of his employees, providing them with pleasant working conditions and good wages. In spite of keen competition, Owen refused to employ children under ten years of age.

Robert Owen saw that the officials of the Christian Churches were the enemies of man's progress towards an era of greater physical and intellectual fulfilment. To remedy this he proposed the establishment of a "rational religion," of a religion the central concern of which should be the social and material well-being of the people, and to preach, not the hopeless doctrine of human wickedness, but a constructive creed of human worth and dignity.

The secular movement thus fostered by Robert Owen was maintained after his death in 1858 by a number of clear-sighted followers, among whom George Holyoake stands out as a commanding figure. As a boy, Holyoake saw the sufferings imposed upon his parents and friends through the folly and intolerance of professing Christians enjoying positions of authority. He resolved to devote himself to the destruction of those conventions of thought and

behaviour which kept alive the dark spirit of inhumanity in the mind of man. To this end he founded, edited, and wrote for a succession of journals, and suffered imprisonment for his convictions. But he did not suffer in vain, and the world to-day knows that he was right.

John Ruskin (1819-1900) was moved to bitter criticism of the Christian spirit by what he read and saw of the miserable plight of the victims of sweated labour and the harshness of the money-makers. In his *Sesame and Lilies* he wrote:—

“I say, you despise compassion . . . it is our imaginary Christianity that helps us to commit these crimes, for we revel and luxuriate in our faith, for the lewd sensation of it; dressing *it* up, like everything else in fiction . . . this gas-lighted, and gas-inspired, Christianity, we are triumphant in, and draw back the hem of our robes from the touch of the heretics who dispute it.”

Three other events in the nineteenth century which spoke of the gathering might of humanitarian doctrine may be noted.

The first was the work of Clarkson and Wilberforce against slavery which resulted in the passing of the Abolition Act of 1807. The second was the commencement of the revision of the severe criminal laws which up to that time had made some three hundred offences punishable by death. This work was successfully undertaken by the great English Law reformer, Sir Samuel Romilly (1757-1818). The third was the introduction of legislation controlling the employment of women and children in mines and factories.

Children at that time could be compelled to work for unlimited hours, both day and night, for very small wages, regardless of sex or age. In 1833 a comprehensive Act was passed covering the employment of children in textile factories, by which the age of

juvenile employees was limited to nine years, and the hours of work restricted.

In due course non-textile industries came within the scope of factory legislation, and gradually a greater regard for the health and safety of workers in factories and workshops was exhibited by employers under supervision by State authorities.

The growth of humanitarianism from the eighteenth to the present century, and of secularism from the second half of the nineteenth, encouraged the activities of the socialist and co-operative movements in Great Britain. With the latter is especially associated the name of Robert Owen. Together they created the atmosphere most conducive to the whole-hearted and earnest study of man's nature and individuality.

Secularism, as a general tendency of thought and outlook, has resulted, in no small measure, from the great advances of physical and biological sciences in the last century, and is sustained by those which have marked the course of objective inquiry in our own time. These advances have brought before men's eyes a wider view of the terrestrial world, of the mundane problems with which humanity must cope; and a correspondingly narrower one of that nebulous kingdom so glowingly described by the theologians.

Secularism has become almost a commonplace of modern times, in which the majority of thinking men and women are united in the desire to improve the material conditions of life at all levels of the community. The influence of theological opinions, once so strong in the field of the "good life," has become attenuated to a degree at which it is almost negligible as a factor in the study of the problems of economic and social organization. Hence the recent publicizing of the "Recall to Religion" movement, which, in spite of much verbal effort on the part of some eminent speakers, does not appear to have left any marked impression on the public.¹

¹ While it is safe to say that to-day a large proportion of the people, including Roman Catholics, take much less heed of

The creation of a fundamental interest in man leads naturally to the scrutiny of him. We all find fascination in a mystery, and in the human organism there is mystery enough to satisfy the most avid thinker. In the course of the following chapters we shall make a survey of the salient researches that have contributed to twentieth-century concepts of *Homo sapiens* and his future.

the teachings of their Churches in their business and private lives than is commonly supposed, we note that the Roman Catholic Church continues to apply its influence in the spheres of education and international politics.

PART TWO

ORGANIC MAN

Locke would have us begin with the study of spirits and go on to that of bodies. This is the method of superstition, prejudice, and error; it is not the method of nature, nor even that of well-ordered reason; it is to learn to see by shutting our eyes. We must have studied bodies long enough before we can form any true idea of spirits, or even suspect that there are such beings.—J. J. ROUSSEAU.

CHAPTER FIVE

MAN IN THE MAKING

THE earliest indications of man's appearance on the earth are to be seen in the simple tools he made. Archæologists have gathered many samples of the rough implements of primitive man from widely scattered areas in Europe and Asia. When skeletal remains bearing a more or less evident resemblance to human proportions were found, in association both with man-made tools and with the remains of certain mammals now extinct, such as the sabre-toothed tiger and the mammoth, there was good reason to believe that the antiquity of man was very much greater than had hitherto been supposed.

While a vast number of flint, stone, and bone implements has been discovered in the course of the last 150 years, organic relics of prehistoric man have been relatively scanty and extremely fragmentary. In the late eighteenth century flint tools and some skeletons were recovered, but such finds did not appear to have any marked effect on current ideas of man's antiquity, which, according to the peculiar reckonings of the theologians, dated back to a little more than four thousand years B.C.

The widely held belief in the Adam and Eve doctrine effectively prevented progress in the study of man's origin. Even scientists, some of them Fellows of the Royal Society, were induced by their religious convictions to distort their interpretations of available data in order to fit them into the scriptural conception of the genesis of the human species. Cuvier, the great French palæontologist and comparative anatomist, refused to believe that fossilized remains of man would ever be discovered. He accepted the traditional estimate of the earth's age, and the biblical account of the Creation.

Early in the nineteenth century evidence began to come to hand of the existence of primitive men in very remote ages. Father MacEnery in 1825 carried out excavations in Kent's Cavern, near Torquay. He discovered the tooth of a rhinoceros in association with flint implements of undoubted human manufacture. This lent weight to the tentative hypothesis then entertained by some archæologists that the ancestors of modern man had walked the earth long before the date fixed by the clerics. Dean Buckland severely criticized MacEnery's conclusions.

The discovery of a skull in the Cotswold Hills led Professor Baden Powell, F.R.S. (1796-1860), mathematician at Oxford and one-time Vicar of Plumstead, Kent, to suggest that it probably belonged to a man who had lived before Adam. He was promptly and publicly rebuked by a Scottish divine for uttering such a heretical opinion.

In course of time human fragments were exhumed from layers of the earth's crust to which geologists were able to ascribe a great age. In 1857 many fossil bones, from which complete skeletons have since been reconstructed, were discovered in the Neander Valley and some other parts of Europe. The brain as measured from a detailed study of the skull was seen to be large in proportion to body-size. It had an estimated volume of about 1,600 c.cm.—that is, 150 c.cm. larger than the brain of modern man. The

species to which these remains belonged was named *Homo Neanderthalensis*, or Neanderthal Man.

In the last decade of the nineteenth century ancient sub-human relics were unearthed in Java. Examination of the skull showed the brain to have been about 900 c.cm.—much larger than the brain of any ape, which has an average volume of some 550 c.cm. Yet the forehead was flattened, and there were heavy eye-ridges. The teeth resembled human teeth; and the height of this man-like creature was estimated to be about $5\frac{1}{2}$ feet. The organism was called the Java Man, or *Pithecanthropus erectus*, and is believed to have lived about one million years ago. The Java Man is regarded as being probably the farthest removed of all prehistoric men from the true human species.

Early in the twentieth century two other primitive types of man were brought to light. These were the Heidelberg Man, or *Homo Heidelbergensis*, and the Piltdown Man, *Eoanthropus Dawsonii*. Portions of the skeleton of the first were unearthed in Germany. Having distinctively modern characteristics, the owner of these bones was placed in the genus *Homo*, and is believed to have walked the earth about 400,000 years ago. Piltdown Man was found in Sussex, and is reckoned to have lived about 200,000 years ago. The volume of his brain has been estimated at 1,350 c.cm.

In 1927 Pekin Man was discovered. His skeleton has been reconstructed from many fossil bones excavated in China. This race is called *Sinanthropus Pekinensis*, and there is a possibility that it was in existence even before Java Man.

The skeletal remains, almost complete in many cases, of early representatives of true men more advanced than Neanderthal Man were discovered about seventy years ago in various localities in southern France. These were the Cro-Magnon people, whom anthropologists classify as *Homo sapiens*, and who apparently lived in Europe some 25,000 years ago. Their brains were large, having an

estimated volume of 1,730 c.cm.—that is, about 300 c.cm. larger than the brain of modern man. It is thought probable that their characteristics have long since become merged in the stream of present-day European types. The cultural activities of the Cro-Magnon people included drawings of mammoths and other now-extinct animals, the making of spearheads and knives of stone. They knew how to make fires, an accomplishment that must have been of great value, since they lived in a period when immense areas were covered by glaciers.

The cultures which include the manufacture of stone and flint artifacts and the use of fire, and are associated with the early primitive man-like types to which we have just referred, make up the Old Stone (Palæolithic) Age. About 15,000 years ago *Homo sapiens* acquired a number of other arts and cultural practices. Stone implements were smoothed and polished; wood began to be used for making shelters and other useful articles. Men began to cultivate plants for food and to care for animals. Thus agriculture started in a humble way. There is, in addition, evidence that they evolved simple social and religious ideas. They buried their dead. To this period the name New Stone (Neolithic) Age is given.

The Bronze Age followed in Asia about 6,000 years ago. In this age the Egyptian and related cultures grew up, and in due time diffused throughout Europe. Language and systems of writing developed, and these have played a vital part in the rise of civilization through their use in the communication of knowledge and the preservation of it in more or less permanent forms on clay tablets and papyrus. For something like 3,000 years now man has lived in the Iron Age, having learned how to win the metal from ores and to harden it in the production of steel.

The researches of anthropologists and archæologists have established beyond doubt the great antiquity of man's ancestry. They have built up a virtually complete story of the progress of human culture through-

out the world, and have given us no uncertain picture of the part the evolving brain of man has played in that progress. Professor Judson Herrick, of the University of Chicago, has said:—

“The advance in efficiency of the human race as compared with its brutish ancestors is to be sought rather in a more efficient control apparatus, the brain, for the utilization of the sensory data for the welfare of the organism.”¹

There is in all of us a trace of the savage and the brute which it would be as well for us to recognize, so that it may be possible to arrive at a balanced estimate of human virtues and potentialities. As Frederic Wood Jones (*Life and Living*, 1939) has written:—

“In all our most constructive thought processes we have the dead weight of the animal, the savage, and the childish mind to live down before we can be free to think as modern civilized man.”

With this salutary reminder of our humble beginnings and of the sub-human forces that lie deep below the level of our conscious lives, we turn our attention to the steps by which men gathered knowledge of the structure and functions of the human body.

¹ *Your Brain and its Story*, R. J. A. Berry, p. 68.

CHAPTER SIX

THE HUMAN BODY

THE human body is composed of about one thousand billion cells, all of which have descended from a single cell, the fertilized egg. It also contains a great many chemical elements and a still greater number of chemical compounds. From their ceaseless interactions emerge the vital characteristics of growth, assimilation, sensitivity, sexuality, and thought. The idiot and the genius are their products.

The organization of the living components, the cells, is both complex and efficient. Groups of similar cells compose the tissues among which we recognize muscular, nervous, glandular, and connective tissues. Each kind of tissue has physical as well as functional properties which distinguish it from the others. Muscle-tissue is contractile, and nervous tissue can conduct impulses or messages from one organ to another.

While cells are invisible unless viewed through the microscope, the tissues are not. The larger structures of the body—e.g., the heart, brain, liver, kidney, etc.—are organs and are themselves composed of different tissues closely bound together and nicely adjusted in their functions.

The cells, tissues, and organs are bathed in a thin, watery fluid called lymph. This exudes through the walls of the smallest blood-vessels—viz., the capillaries—and is almost identical in chemical composition with the liquid portion of the blood from which it is derived. Since this lymph lies between the walls of the capillaries and the tissues, all material exchanges between the latter and the blood must take place through it. Thus food and oxygen destined for the cells must first traverse this lymph film on their way from the blood confined in the vessels. The same is true

for the various soluble waste products produced by the living cells and transported in the opposite direction.

The blood is a tissue in which the cells—red and white corpuscles—float in the liquid plasma. Its principal function—that of transport—gives it a most significant place in the economy of the body.

Some portions of the body are composed largely of materials which have been built up by special cells from substances supplied to them in the food. For example, the bones, teeth, hair, and nails are products of cell activity. The secretions, also, such as saliva, tears, digestive juices, and hormones, are non-cellular, non-living fluids.

Early investigations of the human body commenced in ancient Greece. But before this the Egyptians must have gained some insight into its internal structure through their practice of embalming the bodies of the dead.

There are indications that dissections of the human body were carried out by Herophilus and Erasistratus, two ancient Greek physicians. Herophilus, a native of Chalcedon, worked during the fourth and third centuries B.C., and was associated with the foundation of a medical school at Alexandria, where animals and human bodies were dissected. Erasistratus was active during the third century, and attained distinction as an anatomist and surgeon.

Coming nearer to the modern period, we find Italy to be the centre of anatomical studies in the Middle Ages and the Renaissance. In the second half of the thirteenth century lectures were being given at Bologna. The evidence of anatomists was used at the trials of persons accused of murder by poisoning.

In 1300 Boniface VIII issued a Papal Bull in which he threatened with excommunication "those who eviscerate the bodies of the dead and barbarously boil them in order that the bones separated from the flesh may be carried for sepulture into their own country." While it is probable that this edict did not refer to

serious anatomical research, it was, nevertheless, interpreted in France and some other countries as a general ban on human dissection. Italian scholars, however, ignored it. We find that a work on the structure of the body was produced in 1316 by a man of learning who made no secret of the fact that he had dissected two or three corpses.

Interest in anatomy was particularly strong in Bologna. In Florence the study of the human form, stimulated by the needs of artists for an exact knowledge of the skeleton and the muscular system, became towards the end of the fifteenth century a subject claiming a wide popularity. In 1505 a public dissection took place in the anatomical theatre at Santa Croce, and for a while this kind of exhibition conducted by a professor, demonstrator, and dissectors was something of a social entertainment at which any member of the public was allowed to be present.

Leonardo da Vinci (1452-1519), inventor, artist, and scientist, studied the muscles of the body to gain first-hand material for his work as a painter. He obtained permission from the monks of the hospital of Santa Maria Novella to dissect the bodies of persons who had died there. He dissected the cadavers of an old and withered man (very suitable for his purpose, he declared, because of the absence of fat), a two-year-old boy, a baby four months old, and the corpse of a pregnant woman. In the course of his life's work Leonardo claimed to have dissected thirty bodies, often under conditions so gruesome that they would have effectively deterred a less resolute man.

From the practical business of probing the structure of the human frame, Leonardo turned gladly to the task of employing his unique artistic powers in the preparation of accurate drawings recording his observations. These, he held, were more valuable than many pages of written descriptions for conveying to the student an understanding of the structure of the body of man, "that first beast among the animals."

Whereas the anatomical studies of Leonardo da Vinci were primarily inspired by artistic interests, those conducted in the sixteenth century by Andreas Vesalius (1514-1564) were for the advancement of medicine and surgery. Vesalius, Flemish anatomist, journeyed to Italy, where he found opportunities, lacking in other countries, for dissecting the human body. His great work is *De Corporis Humani Fabrica*, published in 1543. (In the February of 1944 a small exhibition to celebrate the four hundredth anniversary of the publication of the *De Fabrica* was on view at the Hunterian Museum, University of Glasgow.) It was largely due to Vesalius that there was initiated a new attitude towards the study and teaching of anatomy which, as it spread throughout Europe, was to have a profound influence for good on the subsequent progress of medical science.

In the eighteenth and nineteenth centuries anatomy was pursued in the medical schools and the hospital post-mortem rooms. Many valuable treatises, lavishly illustrated by skilful artists specially commissioned for the work, dealing with the structure of the body were published during this period. Beautiful models of many kinds were made by experts to represent important organic features. The now famous museums of John and William Hunter were in process of being built up.

But the pursuit of anatomy earned for itself an unenviable reputation. In the popular mind it was associated with the most gruesome practices, and inevitably ran counter to the ingrained religious scruples characteristic of the time. In life one had no certainty that after death one's corpse would not end up on the dissecting-table with muscles, bones, and viscera neatly exposed before a gathering of ribald students.

The supply of human subjects was often inadequate to meet the needs of the teaching hospitals, a state of things that gave rise to the activities of the Resurrectionists or body-snatchers. These men flourished between 1760 and 1835. They made it their business

to rifle the graves of newly-buried corpses, for which there was a ready market at the side-doors of the medical-school anatomy rooms. The notorious resurrectionists Burke and Hare extended their methods by resorting to murder in order to secure subjects.

Their discovery put an end to the infamous traffic in dead bodies. In 1832 the British Anatomy Act was passed. This laid down the conditions by which the supply (chiefly from workhouses) of subjects for tuition and research must be regulated.

While the larger structures of the body were under investigation there existed an almost unexplored field of microscopic detail awaiting attention. Rapid advances were achieved in this during the second half of the nineteenth century owing to the improvement of the microscope, and the discovery of methods which made it possible to prepare extremely thin sections or slices of organs and to colour them with contrasting dyes.

As a result we now have an accurate knowledge of the microscopic appearance of every part of the body. Moreover, we know how this may be altered by diseases of various kinds, and have turned such knowledge to good use in the diagnosis and treatment of abnormal conditions.

One organ of the body in particular—the brain—has been very thoroughly studied with the aid of the high-power microscope. Specialists in mental diseases have discovered that the brain tissues of an imbecile differ markedly from those of a person of normal intelligence, and that the idiocy, speechlessness, lack of moral and social sense, and general helplessness of so many inmates of Mental Institutions go hand in hand with a subnormal growth of the brain cells.

In some ways the brain tissues of low-grade mental defectives resemble those of monkeys and apes. This seems to suggest that an arrest of the early development of the infant brain will give it a form approximating to the type of organ found in those animals, and a

mentality in the adult which, like that of apes, is lacking in the higher qualities of self-control, social feeling, and moral sense.

As anatomy progressed men turned to a consideration of the purposes which the various parts of the body might serve. First ideas were, not unnaturally, infused with mystical elements, and based largely on the supposed influence of hypothetical "spirits" which were believed to wander from one part of the organism to another, giving rise to the vital operations of the body. It was William Harvey (1578-1657) who put the study of the organic functions on a strictly scientific footing. Although he himself was intellectually bound to the traditional philosophical approach to the working of the principal organs—viz., the heart, liver, brain, lungs—his experimental, and therefore objective, investigation of the circulatory system was so successful that it opened a new method of inquiry into physiological problems.

For nearly three hundred years human physiology has advanced as the demands of medicine and surgery have been for a more and more accurate understanding of the specific functions of the nerves, blood, glands, and muscles. The majority of the great contributors to physiological knowledge have been physicians and surgeons. Coming into daily contact with the manifestations of disease and functional disorder, they were stimulated to probe into the secrets of the body: breathing, digestion, conduction of nervous impulses, excretion, sensing, muscular co-ordination and so on.

With the passage of time the older notions of "vital spirits" were discarded in favour of more materialistic concepts embodying the actions and interactions of real substances, of definite chemical compounds which scientists soon learned to detect, isolate, and synthesize. It even became possible to investigate in a test-tube processes that at one time it was thought could go on only in the living body.

Further consideration will be given later (see Chapter Eight) to some parts of physiology having a

close connection with the immediate problems of living, with the physical and mental efficiency of the child and adult, and with the development of the human personality. Also, the value of physiological knowledge in relation to an understanding of mental and social problems will become apparent in other parts of this book.

In the next chapter it is proposed to make a broad survey of some of the more specialized studies of Organic Man in order to see how they have contributed to our present outlook on man as an animal organism.

CHAPTER SEVEN

SOME METHODS AND APPLICATIONS

WHILE human anatomy has been at all times directly approached through dissection, physiologists have been forced to employ more devious methods, due to the natural limitations of direct experiment in this field. It is obviously impracticable to use the human living subject for a great range of experiments involving physical interference with vital internal organs. So recourse is had to the bodies of suitable vertebrates such as monkeys, rabbits, cats, dogs, guinea-pigs, and frogs, for the experimental study of how our bodies work, how glands secrete their fluids, how the flow of blood to an organ varies, how these functions are affected by changes in other parts such as the nerves and muscles.

The employment of living animals under anæsthesia for biological research is known as vivisection, and is a facility granted by the State only to qualified scientists. It is well known that the practice of vivisection continues to be the subject of much controversy in which many conflicting principles are involved. But despite the organized agitations of anti-vivisectionists there is no present sign that the physiologist is in any danger of losing this profitable avenue of approach to the problems of human physiology.

There is, of course, a close structural resemblance between man and the common domestic animals. It is considered reasonably safe to apply knowledge derived from experiments with these creatures to the interpretation of human physiological processes. The investigations of the American scientist, W. B. Cannon, into the sympathetic nervous system (a special set of nerves lying alongside the spinal cord and connecting up the brain and cord with the internal

organs over which we have no conscious control) were carried out on cats, but his results are directly applicable to our conception of the working of the corresponding nerve structures in man.

The same is true of studies of the way in which the different parts work in harmony with each other, suiting their activities to the requirements of the organism as a whole, studies which it would be quite impossible to pursue directly in the human body. Many problems of muscle, nerve, and heart physiology in man have been minutely investigated and solved through the medium of the humble frog.

At the same time, we may observe that it has been possible to investigate directly in man certain of the more accessible functions, such as breathing, kidney excretion, digestion, and others, by means of accurate chemical analyses of blood, urine, and expired air. Information thus obtained can often be reinforced and confirmed by data from animal experiments. In addition, the treatment of many disorders in which the organs simply do not work properly or are actually damaged, while making use of our present knowledge of physiology, has yielded golden opportunities for doctors, surgeons, physiologists, and biochemists to acquire fresh insight into important body functions.

We must not omit to mention the fact that there have been not a few instances in which scientists have submitted to experiments on their own persons. Haffkine performed tests on himself in the study of plague. J. B. S. Haldane has directed and taken part in many dangerous researches on breathing and blood chemistry, using his own body as a living test-tube. Numerous tests of the curative value of new sera and drugs have been performed in centres of medical research, through the willing co-operation of groups of nurses and students acting as human guinea-pigs.

The study of the human form throughout the world, its external proportions and internal parts, has provided information of particular interest to the student of the races of mankind. In recent times new oppor-

tunities have occurred for the collection of data on this subject. For example, the practice of making physical measurements of students undergoing gymnastic training, and of army recruits in various countries, has provided the ethnologist with the means whereby he can proceed, on the basis of physical characteristics, to separate the peoples of the world into natural groups, to speculate on their origin and past history, to form some conception of their relationships.

The use of a standardized system of measurements in connection with certain structural components of the body, such as the skull, spinal column and limb-bones, the nose and hair, has turned out to be of greater value than any descriptive records of head shape, limb proportions, etc., previously used in the examination and comparison of racial types.

Measurements of distances between internationally recognized points on the skull, of angles between standard planes, are used to calculate the values of *Indices* and *Angles* according to formulæ which anthropologists have devised. For example, the *Cephalic Index* is a number which expresses the ratio of the greatest width to the length (measured in accordance with fixed standards) of the skull. The width is divided by the length and multiplied by 100. The *Cephalic Index* of every race is known, and varies from something under 70 to a little over 85. The British have a *Cephalic Index* of between 75 and 80.

In a somewhat similar manner *Indices* are calculated for the vertebral column, the pelvis or hip-girdle, the arm and leg bones, etc. It is thus possible to make reliable comparisons based on *quantitative* data of one type of *Homo sapiens* with another.

An estimation of the size of the brain which has been in a skull was at one time made by filling the empty cranial cavity with lead shot, pouring this into a measuring cylinder, and deducing therefrom the volume of the brain. More recently a mathematical method has been in use for the determination of

brain-volume. This has the advantage of being applicable to the living head, and has therefore been quickly adopted by nerve specialists and students of mental diseases as a means enabling them to correlate conditions of imbecility and feeble-mindedness with the volume of the brain.

The setting up of medical schools in the majority of countries has made it possible, when subjects are supplied locally, to obtain facts hitherto scarce concerning the anatomy of different races of man. In the U.S.A. negro bodies have long been used in the dissecting-rooms. The entry of the Chinese and Japanese into the practice of modern medicine has contributed in no small degree, through the dissections and records made in their own institutions, to the advance in the study of racial anatomy.

A comparative study of human anatomy and that of monkeys and apes has shown that our bodies contain a number of structures possessed by the latter creatures, but in a reduced or vestigial condition. Darwin enumerated many unique points of resemblance between man and monkey. The later work of Sir Arthur Keith, in which he made a detailed and quantitative comparison of certain selected features of man's anatomy with the corresponding ones in the great apes—the gorilla, chimpanzee, and orang-utan—provided strong evidence that we are more nearly related to the gorilla than to either the chimpanzee or the orang-utan.

A physiological method has provided interesting confirmation of the findings of the comparative anatomist. This is based upon the way in which the blood of one animal will act upon that of another when mixed with it. The procedure is as follows:—

If a little human blood is injected into a rabbit at intervals, the blood of the rabbit gradually becomes charged with a substance called an *anti-body*, which has a strong coagulating or “curdling” effect on human blood. This sensitized blood is withdrawn from the rabbit and allowed to clot. The clear liquid

or *serum* which squeezes out of this clot is collected: it contains the anti-body mentioned above.

When this serum is mixed with human blood in a test-tube it causes the blood to curdle *completely*. But when added to gorilla's blood it produces only a partial curdling—actually 64 per cent. of that which occurs in man's blood. Progressively smaller effects are produced with blood from the chimpanzee, orang-utan, and baboon.

Here is direct evidence of a blood relationship between man and the apes.

CHAPTER EIGHT

THE CHEMICAL BASIS OF HUMAN NATURE

OUR present knowledge of the chemical processes which go on in the living body, and which are collectively referred to as *metabolism*, began to be acquired in the seventeenth century. We may perhaps discern in the tentative employment of herbs and metals in medical practices of the Middle Ages a faint link between chemical ideas and bodily functions. A considerable variety of natural substances—animal, plant, and mineral—were commonly used by travelling physicians, quacks, and charlatans. Alchemists were absorbed in endless experiments to discover a method by which base metals might be changed into gold. There was a sustained search for the elusive *elixir vitae* and *magisterium*, universal medicines which would enable men to achieve everlasting life and to cure all manner of diseases.

In the person of Johann Baptist van Helmont (1577–1644), contemporary of Harvey, Galileo, and Bacon, we have a representative of the period in which medieval alchemy was gradually giving place to the scientific chemistry of the new age. While van Helmont contributed to the development of chemistry by approaching his problems from the experimental angle, his views on the body and its functions were based on a confused mass of mystical and religious beliefs.

One of the first natural functions of the body to be dealt with scientifically was the process of breathing. Great names of the seventeenth century, such as Boyle, Mayow, and Hooke, are associated with this work. In the century that followed, Black, Priestley, and Lavoisier continued investigations in this particular field. They gave us our modern view of breathing

as a burning of substances in the tissues, a process involving the use of oxygen and the production of carbon dioxide.

The nineteenth century saw the beginning of much more exact researches into the nature of the food materials burned up in the course of breathing, the amount of energy released from a given quantity of food, and the volume of oxygen needed for its combustion.

Chemists devised methods by which they could find out the composition of living things and of the various substances they produced. Many of these substances were sources of human food, and so by degrees scientists were able to state in terms of protein, carbohydrate, and fat the composition of every kind of food consumed by man.

In due course the specific importance of these compounds to the life of the body was made clear. Proteins provided the material for the repair of tissues and for the building up of new protoplasm. Carbohydrates, like sugar and starch, and fats were recognized as the main sources of heat and muscular energy.

Now, one of the most interesting facts which ultimately emerged from these experiments was that the human body works on much the same principle as a machine. It will not work unless it has sufficient fuel (food); the harder it works the more food it consumes, and the more oxygen it uses up. As soon as it was seen that there is a definite *quantitative* connection between the food eaten and the work performed by men and women, scientists were able to lay down standards of nutrition that must be adhered to in order to maintain the health and physical efficiency of the community.

Studies in human chemistry thus initiated have occupied an important place in physiological research throughout the present century.

Doctors, biochemists, and dieticians have worked out the basic or minimum food requirements of any

individual with due regard for body-weight, age, and occupation. These requirements include only the ordinary commodities, such as bread, meat, butter or margarine, fruit and vegetables. The necessary quantities of these could be bought for a few shillings weekly, and should therefore find their way on to the tables of even the poorest people. Dieticians point out that however elaborately food is prepared and served, its actual food value is unchanged.

The term "standard diet" is cold and unattractive. It represents the composition of the day's food requirements of the average man or woman engaged in light work. It is expressed not in terms of complete dishes, but of essential constituents—viz. proteins, carbohydrates, and fats. The recommended quantities are $3\frac{1}{2}$ oz. of protein, $3\frac{1}{2}$ oz. of fat, and $16\frac{1}{2}$ oz. of carbohydrate. The energy value of this daily intake is very nearly 3,000 Calories.¹ It is the "unit" of diet, and is called *one Man Value*.

Age, sex, and occupation are important factors influencing food requirements. From the first year of life of a child up to the age of thirteen or fourteen years the Man Value steadily rises from 0.2 to 1.0. During the period of adolescence, when the boy or girl is approaching maturity, with extra demands on energy, the Man Value reaches 1.25 in the case of boys, and 1.05 in the case of girls. In the adult the Man Value drops to 1.0 in males and 0.83 in females.

Two other aspects of biochemistry are of special interest to us here, because they have opened up new approaches to our understanding of human nature, behaviour, and potentialities. They are: first, the discovery that potent chemical substances manufactured by the body, and called *hormones*, are circulated in the blood-stream; and second, the detection and recognition of *vitamins* as essential constituents of food with far-reaching influences on human life and progress. Some thirty years of research into the

¹ A calorie is a unit of heat, just as an inch is a unit of length. One Calorie equals 1,000 calories.

chemical constitution and biological significance of hormones and vitamins have brought us ample evidence of the vital importance of these materials in the unfolding of man's character, and in the growth, through character, of social ideals and aspirations.

It happened in this way. About a century ago physicians were learning to associate some troublesome diseases with abnormal conditions of certain glands which are now called the ductless or endocrine glands. Early in the present century Bayliss and Starling proved experimentally that parts of the body manufacture substances having specific actions on other organs which they reach through the medium of the blood. The laboratory work of the physiologists coupled with the bedside observations of physicians relating to a number of pathological conditions showing a great enlargement of the bones, bloated appearance of the face, discoloration of the skin, wasting, and idiocy, etc., have revealed the existence of several glandular tissues which pour out small quantities of hormones into the circulation.

The study of the activities of these glands, and of the effects of their secretions on bodily and mental states, has given rise to that branch of human physiology called endocrinology.

Endocrinology has shed much light on the way in which the human personality as a whole is related to and influenced by the presence of chemical substances circulating in the blood throughout the body. It has enabled us to see how the physical, intellectual, and emotional development of the individual may be regulated and guided by his secretions and internal chemistry. When we remember that society takes its shape from the thoughts and activities of great numbers of men and women, each with his or her own personality, we get a glimpse of how the ductless glands may be reckoned as a powerful, if remote, factor in the moulding of man's social tendencies.

Dr. Louis Berman, the American scientist, has made an extensive study of the relation between the function-

ing of the ductless glands and personality in his book *The Glands Regulating Personality* (1922). He has shown how the physical, emotional, and intellectual characteristics of human beings can all be accounted for by the varying degrees to which the ductless or endocrine glands, such as the pituitary, thyroid, adrenal, and sex glands (the testis and ovary), make and pour out their chemical fluids or hormones. Working on this principle, Berman has described how the thoughts, actions, and bodily features of such notable characters as Florence Nightingale, Napoleon, Shelley, and Cæsar, may be regarded as the outward expressions of the activity of their ductless glands.

Berman sought to demonstrate that the influence which the great men and women of the past have exerted on the course of human affairs has been primarily determined by the kind of endocrine or hormonal constitution which they happened to inherit. Here is an example from Dr. Berman's book which illustrates his approach to different human temperaments and personalities:—

“Christina may be adrenal cortex centred and so masculinoid: courageous, sporty, mannish in her tastes, aggressive towards her companions. Dorothea may have a balanced thyroid and pituitary, and so lead the class as good-looking, studious, bright, serene, and mature. Florence who has rather more thyroid than her pituitary can balance, will be bright but flighty, gay but moody, energetic but not as persevering.”

Modern knowledge of the part played by the accessory food factors or vitamins in the maintenance of physical and mental alertness and efficiency has grown out of a long series of observations and experiments extending over something like two hundred years.

In the eighteenth century there came to men's minds the idea that certain human diseases were caused by some kinds of food. No doubt, as Dr. Leslie Harris

(*Vitamins in Theory and Practice*, 1938) suggests, people associated these ills with the presence of evil constituents in the diet rather than with the absence of beneficial ones. So long as they were able to obtain natural foods, especially fresh vegetables and fruit, they were not induced to take any interest in their specific energy values or composition. But when it happened that men serving in ships and in the army were, through force of circumstances, deprived of many natural foods, they frequently developed symptoms of disease from which many died. The commonest disease among soldiers and sailors was scurvy.

Dr. James Lind observed (1757) that scurvy¹ among sailors could be cured by the use of lime or orange juice. Earlier, in 1720, Kramer, a physician in the Austrian army, advocated the same treatment for scurvy. Captain Cook (1728-1779) recognized the value of fresh fruits and vegetables. Beri-beri² was shown to be a dietary disease by a Japanese naval doctor named Takaki. In 1882 he introduced more meat and barley (instead of rice) into the diet of sailors. Later, malformations of the bones in children—viz., rickets—were found to be connected with nutritional defects.

The study of the deficiency diseases through the medium of experimental animals began about 1890, since when the scientific approach to them through the methods of controlled tests has steadily grown in scope and productivity. In 1912 Gowland Hopkins provided the first proof that certain natural foods contain accessory factors, or "vitamines" as Funk called them in the same year. Furthermore, his experiments showed that factors essential for the healthy growth of the rats he was using were effective in very small doses.

The quantitative precision with which Hopkins

¹ In scurvy, bleeding occurs under the surface of the skin, the gums become soft, and the teeth loose.

² Beri-beri is associated with a wasting of the nerves which, if untreated, leads to paralysis and death.

conducted his experiments acted as a stimulus to vitamin research in many countries. The presence of several specific factors in many foods has been detected, and their activity measured against internationally accepted standards. These vitamins have in many cases been isolated, and in some instances have actually been prepared synthetically in the chemical laboratory.

For some time attention was concentrated upon the definitely pathological conditions arising out of improper feeding among adults and children. In the 'thirties of this century evidence was forthcoming that even a degree of vitamin shortage, which did not result in visible abnormality, could exert a harmful effect on the general health, and particularly on physical development and mental alertness in young children. The bearing of this on educational problems is evident. It was seen that a child's poor mental performance at school was not necessarily the result of a mediocre inheritance of brains, but was as likely to be due to poor and insufficient food.

How vitamins do their work is not yet fully understood. Present evidence indicates that some of them, at least, function in conjunction with the digestive juices, whose job it is to convert the principal constituents of the food into simpler substances prior to their passage into the blood. Certain it is that food is useless without its vitamins; growth, tissue repair, and resistance to infection are not maintained in their absence, however complete the diet may otherwise be.

Diseases of the skin, mucous membranes lining the nose and throat, bones, and nerves result from vitamin deficiencies. Lack of these factors also affects the endocrine system, on whose several secretions, as has been said, the colour and tone of the personality depend. The different degrees of driving-power, resistance to fatigue, mental ability, reproductive potency, and emotional intensity to be found in the various types of human beings are the outward expressions of an internal food and hormone relationship.

The importance attached these days to correct feeding is well illustrated by the widespread attention given by experts to the subject of man's food requirements, the relation between occupation and diet, the provision of nourishment for children, expectant and nursing mothers, and their babies. Many foods are now advertised for the vitamins which they naturally contain or which have been added by the manufacturers.

Food so nearly concerns every individual that there is probably no subject of physiological importance on which the general public is at present so well informed as that of nutrition. In times of peace the science of correct feeding makes little contact with the public. With abundant supplies people tend to base their food consumption on personal likes and dislikes, rather than on what their bodies need. This attitude towards food is, according to some dieticians and doctors, responsible for much chronic kidney and heart disease. When war comes, with its inevitable shortages, an intense interest in nutrition is engendered in the public mind by means of lectures, radio talks, Press notices, etc., so that all may realize how much the body can do without, and yet remain healthy and fit.

The modern biochemist visualizes the human organism as an extremely complex mixture of chemicals which are constantly reacting with one another. These are built up and broken down as the body grows or undergoes repair, as it acts and thinks. The totality of physical form, behaviour, and thought is the personality of the individual.

People differ in the ways in which their bodies use the food they eat, so that they acquire different personalities or natures. How the tissues of any man or woman will handle the food supplied to them from the digestive organs will largely depend on the set of hereditary factors he or she gets from the parents. These factors constitute what has been called the "internal destiny" of man, since they appear to be

the primary directors of the development of personality.

To sum up, human personality and human nature seem to have three distinct material or chemical makers. First, the carriers of the hereditary factors, the chromosomes, in the reproductive or sex cells; second, the secretions passing into the blood from the endocrine or ductless glands; third, the food. Of these, only the last two have so far been studied chemically.

PART THREE

MENTAL MAN

Every thought has its physical concomitant in a certain state of the brain; the brain has its biochemical constitution, and acts chemically, with the rest of the body, in accord with the physical and mechanical laws of matter or of nature.—F. S. MARVIN.

CHAPTER NINE

THE RISE OF PSYCHOLOGY

MAN's superiority over the apes has been achieved through the marked increase in size and complexity of the front part of his brain—the cerebral hemispheres—and the accompanying increase in mental powers.

Human life has been enriched beyond measure by the contributions of abstract and constructive thought. Music, art, literature, philosophy, and science are the manifestations of man's unique mental capacities. Hatred, greed, intolerance, and cruelty are the indications of the rude level of brute instinct from which those capacities have emerged, to which they are yet bound.

The human brain is three times larger than that of any ape. The cortex or rind of the cerebral hemispheres is more complex in the arrangement and the number of its nerve cells, estimated at 14,000 million. These cells or neurones are distributed in layers. Lower mammals, such as rabbits and rats, possess three of these layers, apes four, and man six. The innermost layers of neurones are associated with the performance of instinctive automatic actions like self-protection, food-seeking, and mating, while the outer ones in man's brain are the seat of his powers

to reason and to control the instinctive urges of his body. It is generally granted that mental processes are dependent on brain structure.

Behind our ideas of "thinking" and "brain" there hovers that elusive, perplexing something called Mind. The question "What is Mind?" is as difficult to answer as the larger query "What is Life?" It seems that nobody can say for certain what Mind is, although most people have their own views about it. It is a subject about which there is no general agreement, and is one which offers a wide scope for the exercise of the imagination and personal feelings. It is interesting to observe that whereas we find no difficulty in agreeing about, say, the structure of the brain, or what happens to our food when it is acted upon by digestive juices in the alimentary canal, bitter arguments may be aroused by statements about the nature of the Mind and its relationship to the brain.

According to Dean Matthews (*What is Man?*, 1940):—

"The mystery of man is the mystery of mind. It is because men possess minds, or rather because they are minds, that they are not only unique but the central riddle of the universe."

One is inclined to think that it is a case of man having invented a mystery and then being faced with the necessity of solving it. The "mystery of mind" will probably remain as long as the abstraction "mind" is retained in common thought and speech. Closely connected with it are other abstract concepts, such as "soul" and "spirit," which always figure so prominently in discussions concerning human morals and human destiny. Indeed, the "mind" idea is so securely embedded in current views of man that it is impossible to speak of psychological topics without using the term.

Prior to the nineteenth century the study of mind—its nature, origin, and operations—was entirely specu-

lative, forming a part of philosophy. In the late seventeenth century Descartes and Locke were theorizing about the human mind and the processes involved in the acquisition of knowledge about the external world. Descartes developed his dualistic philosophy, in which he assumed body and mind to be separate entities. The body was supposed to function mechanically. From it "animal spirits" passed to the pineal gland attached to the brain, and set up therein conscious mental states or *thought*. John Locke (1632-1704) has been called the father of English psychology. He published in 1690 his *Essay on Human Understanding*, a work that was destined to exert a marked influence on philosophical speculations during the eighteenth century.

What was Locke's approach to mental processes and the acquisition of knowledge? He supposed that the mind is at first like a sheet of white paper, devoid of ideas. Later it becomes covered with all the materials of reason and knowledge. What is the source of these materials? Locke answered: *experience*. Observations of external objects and of internal operations of the mind were believed to supply the understanding with all the materials of thought. Higher thought and the construction of ideas were held to be the products of the comparison and combination of elementary ideas obtained through sensation and reflection.

In the eighteenth century Hume (1711-1776), Scottish philosopher and historian, developed certain parts of Locke's theory. He contended that all ideas must be referable to a definite source or original in impressions secured through the senses—viz., sight, hearing, etc. Ideas that were not so derived were held to be without real or objective meaning—to be, in fact, illusions or products of the imagination.

A contemporary of Hume was David Hartley (1705-1757), philosopher and physician. In 1749 he published *Observations on Man*. He attempted to explain mental processes on a materialistic basis by

supposing that they arose from molecular vibrations in the nervous system.

Coming to the nineteenth century we find the theory of "associationism" dominating the psychological field. This was developed from the conception of consciousness and thought as based upon sensations and ideas *associated* with each other in different ways. In the same period the mathematical and experimental approaches to the study of the mind grew in significance. Herbart encouraged the mathematical treatment of psychological data, and this was later extended and used to greater advantage by Weber, Fechner, and Wundt. For many years now mathematics has been of great value to psychologists, being used in statistics and intelligence tests.

In the concluding years of the nineteenth century the study of the mind became markedly less philosophical and speculative, and more objective and experimental. In 1897 a laboratory for the practical study of psychology was opened at Leipzig by Wilhelm Wundt. This thinker wrote *Principles of Physiological Psychology*, translated into English in 1904, a book that was accorded a high place in psychological literature.

Psychology has, in the course of the last fifty years or so, steadily extended its primary interest in several directions. As a result there have come into being a number of specialities within the main science, which are referred to as normal adult psychology, child psychology, animal psychology, social psychology, abnormal psychology or psychopathology, and individual psychology. In addition, we recognize the emergence in more recent times of industrial psychology, educational psychology, and medical psychology, through which efforts are being made to apply psychological facts and principles to the conduct of child and adult life in the advancement of human welfare and efficiency.

As one of the sciences, psychology derives its conclusions from experience. In its study of mental

content it may employ *observation* and *experiment*. Data obtained from both these kinds of experience make up what is generally termed empirical psychology. By the method of observation the investigator scrutinizes a particular phenomenon under normal or natural conditions. Thus when he watches and records modes of behaviour in an animal, child, or adult, he is content simply to observe. He may also observe the way in which he himself *thinks* about some topic, or his mental reactions—feelings, emotions, and so on—to some experience. This last is called introspection. In contrast to observation, experiment is performed when the psychologist subjects the individual to certain conditions selected by him in order to determine their influence on mental processes.

The psychologist avails himself of every device and source of knowledge likely to yield positive results. Animal biology, physiology, neurology, folk-lore, religion, art, and language, all are probed in the search for new material relevant to the study of man's mind. Early attempts at psychological investigation were based upon introspective methods. Concepts of mind resulting from them were almost entirely subjective, and of significance only for the individual engaged in introspection. In recent times the tendency has been to rely less on introspection and more on observations of behaviour exhibited by human beings and animals. This is especially useful in the cases of children, animals, and lunatics, to whom the questioning method is inapplicable.

To many scientists, especially physiologists and neurologists, mind presents no great mystery. They urge that it should be regarded simply as a manifestation of energy changes taking place in the special cells of the brain—the neurones.

Neurology—the science that deals with the nervous system—has now advanced to a stage at which it is possible to envisage the future correlation of such things as memory, dreams, intellect, reflection, etc., with physical conditions of the brain cells. But most

amateur students confine their attention to the speculative and subjective aspects of mental phenomena, and almost entirely ignore the materialistic approach through neurology.

The reason for this, one suspects, is that while one may acquire with some ease, and even entertainment, a general knowledge of the former, it requires a sustained effort to master the intricacies of the human nervous system. The ordinary man is disinclined to devote a long period of time to the study of a highly technical subject when his interest can be quickly satisfied by the more alluring discourses on psychoanalysis and the like. Dr. R. J. A. Berry (*Your Brain and its Story*, 1939) has summed up the position thus:—

“Philosophical theories of mind . . . are seldom based on the solid, cold, hard facts of life, and these facts are the myriads and myriads of brain-cells. . . . To the jazz-loving, cocktail-drinking, sturdy man and maid of to-day psychology, with its aperitif touches of Freud, sex, and psychoanalysis, is more appealing than the most sublime truths of Spinoza, Leibnitz, Kant, and Bergson, and to both philosophy and psychology does neurology still play, in popular esteem, Cinderella to her elder sisters, though the fairy prince of truth will yet be hers.”

If mental processes depend on the *structure* of the brain, they must also depend on the *chemical changes* that go on in the tissues of that organ. In recent years a considerable amount of work has been done in connection with the composition and chemical activity of the brain, for it is now clear that this organ, like any other part of the body, has its own special needs in the way of building material, fuel, and oxygen if it is to function properly.¹

¹ A grant of up to £15,000 has recently been made by the Rockefeller Foundation for research in neuro-physiology under the direction of Professor E. D. Adrian, Department of Physiology, Cambridge University.

Now, a measure of the rate at which an organ (e.g., the kidney or a muscle) works is obtained by finding out the amount of oxygen a known weight of the organ uses up in a certain time. The activity of each of the principal structures of the body has been investigated by this method. A scientist named Warburg performed this work, and he arranged the various organs in a series according to the vigour with which they consumed oxygen. The brain was placed first in the list.

There is no doubt that mind is conditioned by the manifold chemical processes taking place within the brain. If the materials involved in these processes are lacking or in short supply, then the brain fails, and mental aberrations such as delusions and hallucinations make their appearance.

The study of the chemistry of mind or thought has been called *psycho-chemistry*, and there is every reason to believe that its findings will eventually make substantial contributions to psychology.

The researches of the psycho-chemist have been largely carried out in connection with mental disorders such as dementia præcox, manic-depressive insanity, menopause melancholia, and epilepsy.

A fairly definite picture of the chemical causation (and possible treatment) of such disorders is being slowly evolved. The next step, no doubt, will be the interpretation of normal psychological phenomena in terms of brain chemistry—the supply and interaction of endocrines, vitamins, oxygen, sugars, iron, and the state of acidity or alkalinity of the blood in that organ.

CHAPTER TEN

THE BODY-MIND PROBLEM

THE relation existing between body (or brain) and mind is a problem the solution of which appears to depend more on personal opinion than on scientifically verifiable facts. Generally speaking, physiologists and philosophers band themselves into opposing camps on this question.

The philosophers are able to find reasons why we should not assume that mind depends on brain, or that ideas are formed exclusively in that organ. We think with the mind, they say; for how can a material thing like the brain form and contain non-material ideas? Mind must therefore exist apart from brain. To these arguments the physiologists have a simple and direct answer. Stop the blood supply to the brain for a few seconds and see what happens to your mind. Or dose yourself with a generous quantity of alcohol and watch the change which takes place in your cherished ideas, ideals, and beliefs.

The plain man's attitude towards mind suggests some confusion. He takes it for granted that he thinks with his brain—i.e., that his mental processes go on in the substance of his cerebral tissues—but at the same time he regards his mind—the sum-total of his thought-processes—as existing in some "subtle fashion apart from his brain. This is an acceptable notion because it enables him to maintain his belief in the continued existence of his mind and "personality" after death. It saves him from those materialistic analyses of his being which seek to reduce his warm desires and emotions to the cold, impersonal level of nervous mechanisms.

Theological dogma has for centuries maintained that an extra-corporeal entity—the soul—resides in the human body. So closely has this assertion (for

which, by the way, there is not the slightest trace of supporting evidence) become woven into common thought, that any attempt to dispense with or to belittle it involves agitation not only within the sphere of psychological theory, but also within the fields of religious belief and social conduct. The soul dogma may be out of fashion among certain sections of the more enlightened public, but it undoubtedly plays an influential part in individual and national life as a whole, and on that count alone it cannot be lightly dismissed from an objective study of man.

The nature of the relationship between body and mind is important for both psychology and religion, and more remotely for sociology. Three fundamental viewpoints concerning this relationship are here examined.

Body and mind are distinct entities intimately associated with each other during life, dissociable with continued existence of the latter at death. This is the ancient and traditional belief which has become through long ages of religious teaching an integral part of the very fabric of life and conventional thought. From earliest times men have adhered, it seems, to the idea of some immaterial entity residing in the body, and conferring thereon its characteristic manifestations of vitality. This ancient animistic concept has been examined and criticized by many thinkers, but it survives in modern thought because it satisfies fundamental human desires and hopes, and because it cannot be shown by any scientific method to be false.

The late William McDougall, world-famous for his psychological researches and writings, carried out both in England and in America, strongly supported the view of the independent existence of mind. People's actions, he believed, were determined by mental events, were the results of willed and purposive desires. This is the foundation of the school of Purposive Psychology. By postulating the independence of mind, the scope of psychological research is greatly expanded. In his book *Body and Mind* (1938)

McDougall has examined the historical and psychological aspects of animism, and has expressed his own views on the sociological and religious significance of this belief. He wrote as follows:—

“I believe that the future of religion is intimately bound up with the fate of Animism; and especially I believe that, if science should continue to maintain the mechanistic dogma, and consequently to repudiate Animism, the belief in any form of life after death of the body will continue rapidly to decline among all civilized peoples, and will, before many generations have passed away, become a negligible quantity.”

Of the influence of Animism on civilization, McDougall wrote:—

“I should welcome the establishment of sure empirical foundations for the belief that human personality is not wholly destroyed by death . . . and it seems to me highly probable that the passing away of this belief would be calamitous for our civilization. For every vigorous nation seems to have possessed this belief, and the loss of it has accompanied the decay of national vigour in many instances.”

Body alone has existence, mind being simply an abstraction, a fictitious entity. The holders of this view regard all manifestations of “mental activity” merely as physiological processes involving glands and muscles, nerves and sense organs, co-ordinated through the medium of the central nervous system. Psychologists of this school say that there is no objective evidence of a mind which can be studied scientifically. Actions and feelings, they affirm, are mechanically or automatically determined by the impact of physical stimuli on the receptors of the body—viz., eye, ear, nose, etc.—and the changes which such stimuli initiate in the nervous system as a whole. All

that it is possible to *observe* is the *behaviour* of the subject.

For example, Mr. A. is presented with a cheque for a thousand pounds. He takes the gift, smiles with pleasure, and expresses his thanks in suitable words. Objectively considered, there is nothing more to be observed in the whole incident than a series of actions on the part of Mr. A., the stimulus affecting him through his eyes, via the optic nerves, the response in the form of muscular movements of the limbs and face, the tongue and larynx through the medium of the motor nerves.

Exactly what happens between the receipt of the impulses by the brain-cells and the despatch of impulses therefrom to the muscles of the limbs and head is the real difficulty. The mechanists claim that events in the brain can be explained in terms of neuronie connections. To suppose that some entity, called mind, handles sensory impulses or incoming messages and deliberately decides upon suitable messages for despatch to the muscles, is to assume the existence of something for which there is no demonstrable evidence. On this point we may refer to Dr. G. A. Dorsey (*The Nature of Man*, 1927):—

“Where does the ‘mind’ come in? Merely as a figure of speech for the various forms of verbalized behaviour; otherwise, as a mysterious ‘soul’ under a different name. . . . The ‘mind’ must follow the soul into the scrap-heap of worn-out and useless relics of an ignorant past.”

The mechanistic psychologists, or behaviourists, as they are often called, have constructed a system of psychology which renders possible the approach to the problems of mental activity in man along materialistic lines, and rejects as subjective, and therefore unreliable, all material derived from introspection and the appraisal of emotions and sentiments.

The Behaviourist School has flourished for half a century or more in America under the stimulus of

Professor Watson. Criticism of its methods and tenets has been, and still is, strong both in America and Europe. True it has certain weaknesses, but, then, what school of thought has not? The validity of its conclusions has been questioned by John Macmurray in his book *The Boundaries of Science* (1939). He examines the foundations of the behaviourist's approach to psychological questions. Body and mind related in and through *behaviour* appears to afford a promising starting-point for the development of an objective, materialist psychology.

But, as Macmurray points out, when we study behaviour in another human individual, *that study is itself merely an expression of our own behaviour in response to the stimulus of inquiry*. It is impossible to determine the extent to which the observed behaviour may have been modified by the experience of being observed. For it is an axiom of science that the act or operation of studying a phenomenon must in no way bring about a change in the phenomenon itself.

It would seem, therefore, that there are personal factors introduced into the methods employed by behaviourists which must in the long run put a limit to the degree of objectivity with which they can hope to pursue their interests.

The behaviourist is not popular with the plain man. A system of thought which has evolved through a process of stripping the human organism of just those attributes which he has been trained to hold most precious could not be expected to find favour with him. It must, indeed, seem a cold and barren psychology that reduces personal thought to almost imperceptible movements of the musculature of the speech apparatus, and emotions and sentiments to physiological changes in the internal organs. The validity of the behaviourist doctrines, however, is not governed by whether we like or despise them, but only by the extent to which they do, in fact, accurately represent what we, by custom, refer to as mental activity.

Body and mind constitute a single entity, a unified whole without dissociation. This view of the body-mind relationship differs from the previous one in that mind is accepted as a phenomenon manifested through the brain during life, in much the same sense that secretion, for example, is exhibited by special kinds of cells and organs called glands. It precludes the possibility, however, of the separation of mind and body at death. When the brain ceases to function, mind ceases to be. It may seem that, in the long run, there is little difference between this and the second theory, but in fact there is sufficient divergence to render this third concept of considerable practical value to the scientific approach to the body-mind problem. When we postulate a mind capable of existing apart from the body, we leave sure ground for the airy realms of metaphysics.

If we must retain the concept of "mind" as an attribute of man, then this third view is much to be preferred to either of the other two. It keeps mental processes on a physiological basis, and allows a rational approach to the well-known influence which the physico-chemical condition of the body may exert on mental phenomena.

Dr. Louis Berman, the American physician and biochemist to whom reference has already been made in an earlier chapter, has urged the adoption of the idea of the unity of body and mind, and the use of the term *bodymind* to express that essential unity in speech and writing. *Bodymind*, declares Berman, should, as a system, be the material of the child's first studies.

The need for this new outlook is defended on evidence derived from modern researches in biochemistry, physiology, medical and psycho-pathology. Almost every newly acquired fact in these branches of human study has served to strengthen, rather than weaken, the contention that the attributes of individual men and women which we have long since grown accustomed to calling mind, personality, character, temperament, are manifestations of more or less

definite, measurable conditions or states of the body. So closely governed by tangible changes occurring within the nervous system, the blood circulation, the digestive organs, and the endocrine glands, are the general attitude and the reactions of the individual to his surroundings that it seems reasonable to dispense with the ancient animistic belief and to accept the concept denoted by the term bodymind.

Dr. Berman's trenchant criticism of animism (*Food and Character*, 1933) is worth noting. He writes:—

“Animism proclaims us all to be double personalities, leading a double life, the life of the body and the life of the mind or soul. . . . How much evil, misery, unhappiness, disease, and waste are still daily perpetrated as a consequence of the still widespread superstition that regards the body and the mind, the flesh and the spirit, as separate entities, with separate needs, characteristics, powers, and futures!”

CHAPTER ELEVEN

BIOLOGY AND PSYCHOLOGY

THE twentieth-century psychologist and biologist must each have something of the other's outlook on and interest in mind, for science has made it reasonably certain that what we call our thought-processes have, in the final analysis, their origin in the peculiar properties of living matter or protoplasm, and that the human mind is but an expression of brain activity.

Biology, through its emphasis on evolutionary change throughout the animate world, has done much to bring about a conversion of the old static psychology into the dynamic psychology of this century, in which mental processes are seen to be, not a kind of private possession of man, but something that has emerged from sub-human sources and is related to processes of a simpler order in lowlier creatures.

Researches into the structure and evolution of the human nervous system have shown that in its early growth the brain passes through essentially the same phases of development as do the brains of other vertebrates, later assuming its human proportions as the cerebral hemispheres continue to enlarge.

Each stage in the evolution of the vertebrate brain, from fish to man, has been marked by the addition of vast numbers of nerve-cells, and by changes in the relative proportions of its principal parts—viz., the cerebrum, cerebellum, and medulla oblongata. Not only does the human brain contain all the areas of the cortex found in lower primates—e.g., the monkey, ape; they are more widely separated from each other by "association" areas. In these latter the higher thought-processes peculiar to man—abstract thinking, remembering, reasoning, etc.—are believed to go on. Through them reactions to external stimuli are

rendered individualistic, not uniform or stereotyped, as in sub-human creatures.

On biological grounds there is no reason to suppose that man's mental capabilities are anything more than an extension, so to speak, of the feebler or more primitive manifestations of mind discernible in some other vertebrates. Reasoning of an elementary kind can be detected in the behaviour of apes and, it is claimed, in that of birds. The evolutionary approach to the examination and comparison of the responsive and adaptive powers of a whole range of animal organisms culminating in man, has presented us with a view of man's mind as the latest and highest stage of mental evolution running parallel with that of the physical body. To quote the words of Sir Charles Sherrington (*Life's Unfolding*, 1943):—

“Evolution of the mind is as incontestable as evolution of the body. Heredity appears in mental traits as in bodily. It would seem that consentaneously evolution has treated body and mind together. It has envisaged them as complementary features of that which it handles as a concrete unity . . . the individual, which we might even style the concrete persona. Evolution speaks to us in the same breath of body and of mind.”

The biologist naturally asks: Where in the scale of organisms are we to locate the first signs of mind? On this question there appear to be two schools of thought. One, taking a very broad view of the problem, sees even in the most elementary responsive and apparently purposive behaviour of the simplest creatures of the pond, the working of an element of mind. The other holds that mind is recognizable as such only in those animals which possess that degree of flexibility of behaviour which marks them as something more than mere automata. A strictly objective view of the matter would favour the first hypothesis; the second obviously admits subjective criteria.

We may note in passing that a somewhat similar problem is raised by the theological question: At what stage in the development of the human foetus does the immortal soul enter the body? This cannot be answered scientifically, for the simple reason that we have no objective knowledge of the soul. Roman Catholic theologians, however, seem to experience no difficulty in providing answers to questions of this kind.

The common belief that man's mind is something which has arisen *de novo* as a kind of divine gift ought to be discarded without more ado. It has been championed by the Churches because, among other things, it makes the doctrine of free-will and its implications acceptable to the Christian community.

It is not proposed to examine here the thorny problem of Determinism versus Free-will. But of interest in this connection is the observation of Dr. William A. White (*Twentieth-Century Psychiatry*, 1936) that on the one hand progress in our understanding of abnormal states of mind has been possible because we have approached them as products of determinism; while on the other progress in their treatment has been possible because we act "as if" we could alter events—i.e., on the assumption of the truth of free-will or indeterminism.

The adoption of a biological attitude towards man's mind and behaviour enables us to appreciate the importance of the inner instinctive drives or urges which impel men and women to think, reason, and act as they do in response to the varying circumstances of their environment. The human organism, in common with other living things, has certain fundamental needs which must be satisfied. The three primary desiderata are food, protection, and reproduction. The satisfaction of these basic requirements demands that the individual shall make full and constant contact with the world around him, and shall win from the environment those elemental things which his body craves.

All this involves modern man, no less than it did

primitive man, in a struggle with many forces tending to hinder the easy satisfaction of his instinctive urges. He is thus impelled to overcome these obstacles, to adapt himself in some way or other to conditions imposed upon him from without. In these ventures he may or may not be successful. The evolution of civilized life has subjected the individual to numerous restraints which have frequently given rise to disharmonious states of mind or conflicts.

Conflicts of various kinds, and the resulting suppressions, repressions, and neuroses, provide abundant material for the modern writer of fiction. They emerge from the relationships between man and his environment, particularly his man-made social environment.

In higher vertebrates, such as birds and mammals, it is possible for a rapid change-over from one kind of activity to another to occur. The nervous organization of such animals does not favour conflicts. In man, however, the peculiarities of his mind are such as to encourage the appearance of conflicts in his psycho-physical reactions. A conflict unresolved may result in complete inactivity of the individual in a given set of circumstances, a condition which clearly has no biological utility, and may even be disastrous.

The resolution of a conflict may be achieved by the conscious suppression of one of the two opposing urges. It may be achieved unconsciously by the banishment of the conflict into the subconscious mind—i.e., by repression—in which case it may give rise to neuroses and continue to influence the conscious behaviour of the individual without his being aware of it. Or again the conflict may be abolished by examining the conflicting impulses in the light of reason and experience, and then deliberately selecting that mode of behaviour which seems to be most desirable. This last method is seldom possible in the young, in whom, therefore, repressions and neuroses frequently occur.

The sex impulse is quite commonly a source of mental conflict, for the restraints and prohibitions of social life have necessitated the abandonment of the

normal expressions of this impulse except under specific conditions controlled by religious and economic factors. Further reference to these matters will be made in our discussion of Social Man.

The adaptive responses of man to his environment are infinitely more complex and varied than any which, say, an insect or a rabbit can make. While it is true that the prime movers of human behaviour are to be found in the instinctive impulses common to most animals, the behaviour pattern which is finally exhibited in any particular situation may, and generally does, have a very different character from that which might have been predicted on biological grounds. In some way the nervous structure of the human brain has conferred upon man a flexibility of response to environmental stimuli, a flexibility which neurologists, at least, recognize as springing from the immense number of nervous connections and combinations made possible by the cellular complexity of the cerebral hemispheres.

The inherent variability of man's reactions to environmental forces renders them extremely difficult to investigate. For this reason many psychologists have turned to the investigation of animal behaviour, which is relatively simple and straightforward. To quote G. C. Grindley (*The Intelligence of Animals*, 1937):—

“Human psychology has run into difficulties from which it has not yet emerged. Introspection, for a number of reasons, has not yet become a reliable instrument for the study of mental processes. Human behaviour is so complex that it is difficult to study it in any systematic way; but the behaviour of animals is simpler, and is more easily studied under controlled conditions. Many psychologists have felt that if we can first understand the simpler problem of animal behaviour we shall be in a better position to attempt a scientific approach to the study of human behaviour.”

CHAPTER TWELVE

FRONTIERS OF THE MIND

THERE are certain aspects of mind, not ordinarily embraced by orthodox psychologists, which have engaged the attention of some scientists since the eighteenth century. It was then that the German physician Mesmer discovered that the thoughts of one person could affect the mind of another *through space*.

Friedrich Franz Mesmer (1733-1815) called the "influence" that appeared to emanate from the human mind *animal magnetism*. In 1766 he published a treatise in which he described how the nervous system could be affected by the planets. His theory of animal magnetism he applied, it seems with some success, to the treatment of certain disorders of the body. His claims were examined and subsequently rejected by the Academy of Sciences in Paris. As a result of his failure to obtain recognition, Mesmer retired to his own country, where he remained in comparative obscurity until his death.

Mesmer's followers renamed animal magnetism *mesmerism*. This term has now been abandoned in favour of *hypnotism*.

In 1882 the Incorporated Society for Psychical Research was founded for the study of those phenomena which were deemed to be outside the sphere of experimental science. A similar society has been established in America for a like purpose. The events investigated differ widely in character, from clairvoyance to hauntings and materializations. They belong to the so-called "supernormal" type of phenomenon. There are now in existence full and extensive records of experiences, tests, and inquiries which have been handled by the S.P.R. Many eminent scientists have been and are associated with psychic investigations.

Man's awareness of supernatural or, to use a better

word, paranormal phenomena, such as telepathy, crystal visions, hallucinations, etc., can be traced back to ancient Greece and Rome. In the Middle Ages the Christian Church condemned all practices which savoured of wizardry and the work of evil spirits. Those who were discovered to have the gift of "seeing" (the *specularii*) were treated as heretics and enemies of the Faith.

The scientific approach to the peculiar properties or activities of mind exhibited in thought-transference, premonitions, and the like, has led in this century to the establishment of a branch of mental investigation known as parapsychology. Its province lies beyond the confines of the familiar, everyday aspects of mental processes dealt with by psychology. It is concerned with a variety of phenomena usually labelled "psychic," and may therefore be regarded as a half-way house between the interests of the orthodox psychologist and the speculations of the philosopher and the theologian.

Parapsychology is, broadly speaking, identical with the somewhat older psychical research, but it has a more clearly defined scientific objective than has commonly been associated with the study of psychical problems in the past. It sets out with the deliberate intention of investigating these problems by means of rigid experimental methods, in the hope of ultimately linking them up with normal processes of nature.

An outline (adapted from a scheme given by Dr. J. B. Rhine in his *Extra-Sensory Perception*, Faber, 1935) of present-day parapsychological interests may be set down thus:—

- (1) Parapsychical—e.g., telepathy, clairvoyance, dowsing, previsions, etc.
- (2) Parapsycho-physical—e.g., levitation, temperature changes, etc.
- (3) Parapsycho-physiological—e.g., materializations, stigmatization, etc.

(4) Parapsycho - pathological — e.g., psychic healing of organic diseases beyond the effect of suggestion.

We are concerned in this chapter only with the first group of studies—viz., the parapsychical.

There is abundant evidence that some people possess exceptionally acute powers of perception and cognition. Not infrequently these powers perplex the owner and send him or her to consult a medical psychologist or a psychiatrist, who is generally able to explain the position and to suggest some measure of adjustment and control.

The peculiarly extended and sensitive state of perception which operates by means other than those of the recognized senses is known as extra-sensory perception (E.S.P.) or paranormal cognition. Through the mysterious faculty of E.S.P. the thoughts or feelings of one person may be conveyed to and received by another with whom he is *en rapport*, even though they be a considerable distance apart. This phenomenon is known as telepathy.

The perception of an objective fact or relation without the senses is clairvoyance. A dream sometimes portrays the sudden death of a friend or relative in unique, perhaps violent, circumstances. It is discovered later that the death occurred under precisely those conditions "seen" in, and at the same hour as, the dream.

Many cases of telepathic communication, clairvoyance, and prevision—all instances of paranormal cognition—have been examined and recorded during the last half-century. But almost always there have been certain features of such events and experiences which have made the cautious observer hesitate to accept them as exceptions to or evasions of natural law. There is the element of coincidence to be considered; the possibility of secret transference of knowledge; unreliability of testimony, false statements, and so on. The scientific mind, trained in the objective study of

phenomena and in the dispassionate evaluation of evidence, refuses to accept at its face value any theory or hypothetical generalization based merely on personal statements or anecdotal material.

This does not mean that parapsychological topics are dismissed out of hand by intelligent and responsible men of science. On the contrary, even before the close of the nineteenth century the manifestations of E.S.P. were being investigated along scientific lines. In recent years the subject has been given very close attention by Dr. J. B. Rhine and his co-workers of Duke University, U.S.A., with the encouragement and guidance of Professor William McDougall.

Dr. Joseph Banks Rhine is a biologist who has turned to parapsychological research. McDougall has referred to him as "a ruthless seeker after truth." Dr. Rhine and his collaborators have amassed incontestable evidence, in the course of many thousands of controlled laboratory tests, that some men and women possess, in a marked degree, powers, the nature and source of which are at present quite unknown, by which they are able, for example, to call the markings on the covered sides of specially prepared cards, or to read the thoughts of another person screened or at some distance from them.

Furthermore, there is reason to believe that the majority of people are to some small extent endowed with the faculty of E.S.P., which may reveal itself at odd moments—when, for instance, two people living in close mental association with each other form and utter the same thought or idea at the same instant.

A number of attempts have been made from time to time to explain these parapsychological phenomena. In 1897 Sir William Crookes suggested that telepathy might be due to high-frequency vibrations of the ether produced by molecular activity in the brain of the agent and received by the brain of the percipient. Professor Ostwald has suggested that known physiological energies are converted into unknown forms that can be projected through space. Professor

Richet has postulated the existence at the reception end of E.S.P. of a hidden sense: *cryptesthesia*, a "sixth sense" as he called it.

None of the physical hypotheses has so far received any supporting evidence, and psychical theories involving "spirits," "spirit-carriers," and other ghostly agents explain nothing.

We cannot doubt that the aims and future progress of parapsychological investigation will prove to be of great significance for mankind. In the prefatory words of Dr. Rhine (*Extra-Sensory Perception*, 1935):—

"The need felt for more definite knowledge of our place in nature is no mere academic one. Rather it seems to me the great fundamental question lying so tragically unrecognized behind our declining religious system, our floundering ethical orders, and our unguided social philosophies. This work is, then, a step, a modest advance, in the exploration of the unrecognized boundaries and reaches of the human personality, with a deep consciousness of what such steps might lead to in the way of a larger factual scheme for a better living philosophy."

Such work may necessitate a revision of our concepts of mental action, of the bases of knowledge in the sensory apparatus, even of the body-mind relationship. Clearly we are standing at the threshold of new frontiers of the mind. Man's penetration into the country beyond them promises to be a momentous and exciting occasion.

PART FOUR

SOCIAL MAN

For a human society stands high above the integrates we study among the beasts of the field. Man has language, rising above words; he has reason, or the capacity for conceptual inference, rising above intelligence; he has a more or less clear consciousness of his own history; he has the power, if he would oftener exercise it, of guiding his conduct in reference to ideals; and he has apparently unlimited possibilities of ameliorating his social heritage.—J. ARTHUR THOMSON.

CHAPTER THIRTEEN

THE RISE OF SOCIAL STUDIES

MAN is a gregarious animal. His tendency to form groups or communities for mutual aid and protection has resulted in many types of social organization, from that found in primitive tribes to the civilization of Western man.

Social studies, known then as *politics*, were undertaken by the ancient Greeks. Plato in his *Republic* made an analysis of the social structure of his time. He regarded the community as an independent entity emerging from the qualities—ethical and physical—of the individuals within it. In such an organization the rights of the individual were of secondary importance to those of the State. In contrast with Plato's conception of the relation of the individual to society, Aristotle's view of it took on a more democratic colour. Aristotle saw that society grew naturally from the social inclinations of mankind, and believed that the interests of the individual should be served before the demands of the State.

In the Middle Ages social studies were in abeyance. In the seventeenth century there were renewed attempts at an understanding of the social structure and of the

rights of man in relation to it. Most of these efforts were bound up with philosophical and political ideas of the period, and were largely of a speculative nature.

Thomas Hobbes (1588-1679) developed his social (or political) philosophy in his book *Leviathan*. In this the people were shown to be completely subordinated to the will of the ruler. Sovereignty arose from man's agreement to submit to the authority of an individual, or small group of persons, powerful enough to suppress any disruptive influences which might threaten personal security.

In the eighteenth century there came into prominence the theory that the community was a free association of men and women with individual rights and claims to happiness. In 1789 Jeremy Bentham (1748-1832) expounded the principles by which the conduct of private citizens and rulers alike should be guided. The idea originally expressed by Joseph Priestley (1733-1804) in the phrase "the greatest happiness of the greatest number" was adopted by Bentham as the desirable fundamental aim of legislation and government.

However, social studies were not pursued on a systematic basis until after the close of the eighteenth century. In 1798 there was born at Montpellier, in the south of France, Auguste Comte, a man destined to exert a profound influence on sociological thought in the nineteenth century. While in Paris (1818) he met and became friendly with Comte Henri de Saint-Simon, a student of social affairs who, nearly forty years his senior, provided a powerful stimulus to the youthful Comte.

Auguste Comte was indebted to St.-Simon for many ideas, but as the feeling grew in intellectual circles that his own writings were largely reflections of his friend's theories, Comte after a few years severed his connection with him.

Comte began the work for which he is now remembered at a time when science had reached a high pitch of productivity. At the same time there were great

social and political upheavals in Europe which called for a fresh approach to the problems of social organization. He recognized in science the means by which he might arrive at a new conception of society. Discoveries in the fields of physics, astronomy, chemistry, and biology were making it possible to see that natural events and phenomena were ordered by fundamental "laws." The behaviour of inanimate objects under given conditions could be predicted. Chemical substances would react with each other in uniform ways. The processes of life—growth, reproduction, seasonal changes in habits and vitality, etc.—conformed to a "plan," a cycle of events of which any phase could be fairly predicted and described in advance.

Comte observed the power of science to reveal this natural regulation in the physical and biological spheres. Must man remain outside the operations of this universal principle of ordered existence? To this Comte answered "No." The study of social man demanded the setting up of a new, a higher science which could do for humanity what the special sciences had done, and were doing, so successfully in connection with inanimate bodies, and with living animals and plants. It must investigate the several aspects and characteristics of aggregate man in an attempt to formulate the principles by which social life is regulated, and to discover the factors which mould it. This supreme science Comte first named "social physics," a term which spoke of his initial belief that natural law as revealed by physical science was also applicable to human life and human relationships within the community. Later, he substituted for it the title of "sociology," a word of his own making.

From his early twenties to the end of his life in 1857 Comte devoted all his thought and energies to the task of developing a synthetic scheme embracing human society. Social Man, not the individual, was the organism of which sociology had to take account. Its concern was the discovery in natural law of a basis

on which the prosperity and advancement of humanity could be planned and brought to fruition. His two notable works were *Positive Philosophy*, containing his synthesis based on science, and *Positive Polity*, which set out the manner of its application to social problems.

Comte was born of a Catholic family at a time when the influence of the Church on social affairs was on the decline. It was as an effective substitute for a weakening ecclesiastical authority that he proposed the adoption of scientific concepts as guides to the establishment of the new social order which he had in view. He planned for the rise of a "religion of humanity" that should erase from the social scene the chaotic influence of conflict-provoking beliefs and dogmas.

The next great figure in the sociological field was Herbert Spencer (1820-1903). He, like Auguste Comte, set out to develop a scheme of approach to the study of human social forms on scientific principles, particularly biological ones. Evolution was the process by which all things came into being, passing from simple states to complex; thus had the social organization evolved from the simple type found in early and primitive human communities. In the characteristic features of savage life Spencer believed the beginnings of higher societies were to be found.

The idea of the *social organism* was fundamental in Spencer's sociological theories. He was impressed by the similarities which could be discerned between the structural and functional properties of the human body and those exhibited within the State. To begin with, the community of the Nation or State is composed of units which are individual men and women, while the body is composed of units called cells. Then the members (units) of the community are engaged, generally in smaller groups, in the performance of specific tasks necessary for the upkeep of the social order. There is division of labour like that in the working of the body; one group makes clothes,

another grows food, another builds houses, and so on. To facilitate the labours of these groups, transport and communication systems have been evolved consisting of roads, railways, canals, telephone, and postal services. These systems are in turn controlled by higher State departments. In the living body groups of cells or tissues are engaged on special tasks: digesting food, secreting juices, getting rid of waste matter. The transport system is the blood-stream, and the communications between one part of the organism and another are provided by the nerves carrying messages to and from the great centre of control—the brain.

The Spencerian doctrine of the social organism came into prominence in the second half of the nineteenth century, and for a while enjoyed some popularity among sociologists. It seemed to provide a scientific basis for the analysis of social phenomena, to bring the manifold social activities of man into line with evolutionary tendencies inherent in animal life as a whole. The doctrine of the social organism, however, did not escape criticism. It was seen to be too vague and metaphorical to render material assistance in the furtherance of sociological studies. Moreover, anthropological researches showed that the "simplicity" of primitive societies was illusory, their organization being in fact as difficult to understand as that of modern society.

The general decline in its popularity was hastened by the statements of Thomas Henry Huxley, in which he expressed the view that there was an essential difference between the aims and tendencies of man on the one hand, and those which operated in the progress of animal life on the other. This implied that while biological principles could be legitimately used in the study of lower creatures, they should not be applied indiscriminately to human affairs. Man in respect to his social and ethical attributes must occupy a much higher plane than that on which non-human life has its being.

Despite the general abandonment by sociologists of this century of the concept of the social organism, a number of modern thinkers, notably Arthur Dendy, Julian Huxley, W. B. Cannon, and Morley Roberts, have given, in varying degrees, support to it. Their fundamental assertion is that organized society derives its essential character from those same forces which have been in operation for millions of years throughout nature. To quote Dr. Huxley (*Essays of a Biologist*, 1923):—

“But the original contention (the reality of the social organism) still remains, and is logically unassailable. Man is an organism descended from lower organisms; his communities are composed of units bound together for mutual good in a division of labour in the same way as are the cells of a metazoan: he can no more escape the effects of his terrestrial environment than can other organisms. There *is* therefore reason to suppose that the process of evolution in man and man's societies on the one hand, and in lower organisms on the other, must have something important and indeed fundamental in common, something which if we could but unravel would help us in the study of both.”

In his book *The Biological Foundations of Society* (1924), Professor Arthur Dendy set out to show that human society had become organized through the same factors which had brought about the evolutionary ascent of the higher animals from the simpler forms. He wrote:—

“The existence and progressive evolution of human societies depend primarily upon just those factors that we have seen to play a leading part in the evolution of lower organisms—upon the response to stimuli, the accumulation of capital, co-operation, differentiation and division of labour, and upon the integrative action of a well-organized system of control or government.”

One criticism of the social organism concept is based upon the fact that the individuals which compose society are not physically united with each other, as are the cells of the body. Dendy's comment on this was as follows:—

“In short, the bonds by which the solidarity of a human society is secured are mental and moral in their nature, rather than chemical and physical, or even physiological. Mental and moral phenomena may be regarded, however, as expressions of the activity of one particular organ of the body—the brain, and the mental and moral ties that unite human beings with one another are essentially organic.”

A recent criticism of the Spencerian doctrine comes from a sociologist, F. J. Wright (*The Elements of Sociology*, 1942), who writes:—

“But this must remain an analogy only. Community is *not* an organism, and in point of fact the analogy is not even a good one. . . . The cells of an organism cannot be likened to the individuals of a community, for the cells of an organism have of themselves no conscious purposes, no interests which sometimes cut across the interests of other cells, and sometimes act in unison with them, nor can the separate organs of a body be compared with the associations within a modern State, with purposes of their own to serve, associations sometimes with purposes working in co-operation with the general purposes of the whole community, sometimes in opposition, conscious or otherwise, to them.”

In Morley Roberts, on the other hand, we have a staunch supporter of the reality of a social organism. In his book *Bio-Politics* (1938) there is to be found a detailed exposition of the evidence upon which he urges the adoption of the view that human social

groups are organisms as real as those which we accept in any of the animal forms. Roberts began work on this book in 1890, and until its completion in 1937 was constantly studying those aspects of life—biological, pathological, etc.—which seemed to have so much to contribute to the analyses and comparison of the social and animal organisms.

The author of *Bio-Politics* found his interest directed to his subject through a reading, in 1889, of the *Lectures on Pathology* by Dr. H. G. Sutton. From the idea that disease is a product of society, Roberts passed to the larger concept of a social pathology. This naturally implied the existence of a social physiology—i.e., the normality of social functioning. The next step was the acceptance of “a social organism which was a reality and no metaphor.”

Morley Roberts calls his biological approach to the study and interpretation of social phenomena *organic materialism*. He stresses the necessity for its consideration by politicians. He commends it to the attention of sociologists who are “ready to write books which, after putting aside the theory of a social organism, tell the live, complex, organic world how it works, what it should do, and what will be its fate.”

Roberts believes that the controlling, directive power of the human intellect in the shaping of social forms is much less potent than we are accustomed to think. Rather should we prepare our minds to seek for and to evaluate the rôle of those unconscious forces in nature which, he suggests, are the real directors of human progress.

CHAPTER FOURTEEN

THE SOCIOLOGICAL FIELD

SOCIETY has been defined as "every kind and degree of relationship entered into by men—and any other social creatures—with one another" (R. M. MacIver). Sociology is described as "the study of human interactions and interrelations, their conditions and consequences" (M. Ginsberg).

Society is composed of innumerable groupings of individuals held together by common interests and aims. These groups or associations may be small—e.g., the family—or large—e.g., a Church, a nation. Sociology is concerned with the organization of the group, with the purposes for which it exists, the history of its formation, and its relationship with other groups having similar or contrary objectives.

Sociology, being interested in the mass actions and reactions of living organisms, must be placed among the biological sciences, which include botany, zoology, physiology, and psychology. Reference has already been made to the claim put forward by sociologists that their subject be recognized as a science. They collect facts by observation and inquiry, and attempt to frame generalizations from them when considered in relation to each other. The experimental method, however, is denied to the student because it is not possible to isolate a single factor and subject a selected group of people to its influence. There is also to be taken into account the personal bias of the investigator, which, while it may be reduced by deliberate mental discipline, cannot be completely eliminated. It must therefore be expected to influence in some degree the conclusions and theories arrived at in the course of sociological research. The methods of sociology differ markedly from those used by the "quantitative" sciences (e.g., physics, chemistry), and

progress is in consequence relatively slow. The sociologist is, as Dr. Julian Huxley remarks, "inside instead of outside his material."

In the opinion of L. T. Hobhouse (*Development and Purpose*, 1913):—

"Detachment, continuity, and accuracy are the three marks of any science, and any study so marked is scientific, no matter what its subject may be."

The sociologist studies groups of human beings; he does not deal with the individual, as does the psychologist or the physiologist. The material which he investigates is extremely complex, for social phenomena are derived from and influenced by a multiplicity of factors belonging to such things as climatic conditions, physical geography, animal and plant life, traditions and customs, and so on. He takes into account all those factors of time and place which seem to him to affect or modify in any way the behaviour of the group, leading to an increase in power or to its decay. He observes the effects of periodic waves of thought and feeling which spread through a community, bringing momentous changes: the rise of a new religion or the abandonment of an old custom. In every age there arise men of genius who initiate new thoughts and new visions. The influence of such persons on the social structure is studied by the sociologist.

Since the many relationships existing between men derive their forms and motives from a wide variety of sources, the sociologist must draw upon the data provided by the special sciences which deal primarily with human qualities and characteristics of one kind or another.

Human social relationships are based upon individual characters such as temperament, personality, likes and dislikes, timidity, aggressiveness, mental attitudes, and reactions to changing circumstances. The sociologist must therefore have some knowledge of psychology. Ideas, sentiments, values, faiths, and

interests have become woven into social institutions of all kinds, into political and religious associations, class differences, and international relations. Membership of a group offers opportunities for the realization of larger aims, such as those suggested by the terms patriotism, service, freedom.

Men's thoughts become in the moment of their expression part of an immense but invisible network of psychological forces within whose meshes society lives and grows. The application of psychology to the investigation of the interests of social man has given rise to social psychology.

Man has long been concerned with the production of food and raw materials, the employment of labour, with markets and money. The economist studies such matters, as well as the exchange and distribution of goods, the factors regulating supply and demand. Each of these has a place in the moulding of social forms and behaviour. At the other end of the scale from economics there is ethics, which is concerned not with means, but with the ends to be aimed at in terms of the greatest moral good of mankind.

Not all men are prepared to conform to the standards of conduct imposed upon them by the legal system. The study of the numerous forms of transgression to be found in any community, their causes, frequency, and treatment, is known as criminology. Criminal behaviour is known to be determined by many factors: economic, psychological, religious, and physiological.

The problem of the anti-social individual directs our attention to the fundamental questions of man's nurture and breeding as processes to be brought under supervision and control. For both upbringing and parentage determine character and personality. The study of racial betterment by wise breeding, with the checking of hereditary diseases and abnormalities, is the concern of eugenics.

Then, maintaining an ever-watchful guard over the physical conditions under which human beings are

reared—e.g., parental care and infant feeding, exposure to infection, sufficiency of air, sunlight, and exercise—there is the institution of public health, the several departments of which cover between them a wide social field. Both eugenics and public health are considered more fully in later chapters, for they illustrate the strong, almost revolutionary, influence which scientific knowledge is exerting on man's social fortunes.

The sociologist, while investigating types of social phenomena as they present themselves to-day, realizes that they have primary and secondary causes which as a rule can be discovered only by delving into the past. Some knowledge of history is practically indispensable to the inquirer into the origins and growth of social institutions. Modern features of Church, State, Marriage, Law, Humanitarianism, Trade Unionism, etc., have their roots in diverse phases of human history. The whole business of sociological investigation has itself undergone a change of outlook and technique during the last fifty or sixty years as a result of the rise of evolutionary thought which prompted a regard for social forms, institutions, and customs not as fixed, static things, but as developing and mutable products of historical events.

The manifest complexity of human social relationships demands from the sociologist, for clarity's sake, some system of classification. Sydney and Beatrice Webb (*Methods of Social Study*, 1932) have suggested the adoption of four principal types of association or grouping recognizable in modern society. The first type of association arose out of the demands of man's primitive instincts; the second from the development of the religious emotion; the third from considerations of right conduct—i.e., from the acceptance of humanistic principles; the fourth (and most recent) type has emerged from the application of scientific discoveries to human affairs in an attempt to plan for specific ends.

Primitive society was based in the first place upon

the fulfilment of instinctive animal needs. These needs are no less strong and exacting now than they were in the past; their influence can be observed to-day without difficulty. But the primitive foundations of society have become overlaid by new group forms and institutions. The religious emotion, having its genesis in fear, then taking on the elements of awe, wonder, and worship, led to the establishment of the Church, with its subsequent impressions upon social structure and social conduct. Then came the growth of intellectual ideals summed up in the concept of the Rights of Man, which encouraged the formation in Western civilization of institutions the main objective of which was the promotion of human benefits through the fuller enjoyment of life, liberty, and happiness. Finally, a realization of the advantages which could be derived from the use of scientific data in industry, agriculture, education, and public health opened the way to the establishment of new institutions, such, for instance, as the Five-Year Plan in the U.S.S.R., which have entailed the organization of human labour in the furtherance of technological aims.

The discoveries and inventions of scientists—mechanical, chemical, biological—are factors which have exercised an increasingly marked effect on social relationships in the course of the last hundred and fifty years. They are, according to Mark Graubard (*Man; The Slave and Master*, 1939), the "raw materials" of cultural growth, comparable to the mutations or "sports" which provide the material for natural selection and organic evolution. A mutant character, if not actually harmful to life, may be preserved in future generations and later bring into being a new species. In the social sphere, new ideas and practices, if possessed of sufficient vitality and power to drive out the old, may come to be accepted by the community, and thus contribute to the unfolding of a new era of social and cultural progress.

Two inventions in particular—the radio and cine-

matograph—have come to occupy important places in society. Beginning as devices of limited use, they became by degrees sources of public entertainment. To-day they are even more closely associated with our lives as the vehicles of instruction and propaganda, broadening the intellectual field of the individual, and modifying traditional modes of social conduct.

Sociology, with its versatility of method, its immense scope, its high ideals, and its eager utilization of every available form of knowledge, may yet come near to being called the "master science." Certainly the man who devotes himself to its pursuit must needs have a great faith in his capabilities and the object for which he labours.

Meanwhile, the sociologist complains of the indifference shown by national administrators to sociological thought. How many, he asks, of those whose business it is to govern take the trouble to acquaint themselves with current sociological ideas and pronouncements? They are practically unknown to the ordinary citizen, and their study has not yet become a part of the school curriculum.

CHAPTER FIFTEEN

THE CRIMINAL IN SOCIETY

THE study of the anti-social individual—the delinquent and the criminal—has become a major specialization within the field of sociology. Criminology covers the investigation of both crime and the criminal. It is a large subject, growing out of the contributions of sociologists, psychologists, psychiatrists, anthropologists, and geneticists.

In very early times observations were made of the mental and physical characteristics of criminals. There was a tendency to see in criminal actions the marks of animal behaviour. Aristotle believed that he could discern in men certain qualities possessed by those animals which they resembled. After the lapse of many centuries there were renewed attempts to relate personal qualities with physical stigmata. The work of Dalla Porta, sixteenth century, and of Lavater, late eighteenth century, produced the pseudo-science of physiognomy by which it was claimed the character of a man or woman could be read from a scrutiny of the facial configuration.

Dr. Francis Joseph Gall, some twenty years after Lavater, sought to show that mental faculties and characteristics of the human mind are reflected in relief on the external surface of the skull bones.

Both physiognomy and Gall's phrenology have fallen into disrepute, although they still retain an appeal for a certain type of people who place their faith in the divinations of quacks and charlatans. We take note of them here because they were the initial steps by which criminal anthropology came into prominence in the nineteenth century. In Italy the "anthropological school" of criminology was dominated by the personality of Cesare Lombroso (1835-1909). He had adherents in England, France, and Germany.

Lombroso's book *L'Uomo Delinquente* (Criminal Man), published in 1876, set out its author's view that criminality in man must be approached as a pathological phenomenon, not peculiar to the human species, but widespread throughout nature. Violent death, destruction, and predatory acts were events which everywhere marked the course of animal and plant life. Such events must be expected in human life also because of the animal qualities inherent in human nature. Criminal man was a degenerate type which Lombroso relegated to a separate species: *Homo delinquens*, inheriting in his constitution the germs of a-moral tendencies from remote and primitive ancestors; and having in his physical form certain peculiarities of face and limb by which he might be distinguished from the non-criminal.

Such was the anthropological theory of crime and the evil-doer. It was in direct contrast with the fundamental doctrine supported by French criminologists of the second half of the nineteenth century, who represented the "environmental school" led by Lacassagne (1843-1924) of Lyon. Lamarck and Geoffroy St.-Hilaire had laid emphasis on the influence of the environment in organic evolution, and had drawn attention to the way in which an organism could undergo modification through the impact of environmental forces upon it.

The criminologists thus recognized in the constitution of a man's environment the influences which were largely responsible for his social reactions. Whereas Lombroso held that the criminal was born so, and therefore incapable of reform, the environmentalists believed that the criminal was made by the circumstances in which he had to live, and could, by the removal of those circumstances which encouraged criminal behaviour, be changed into a useful and desirable member of society.

Enrico Ferri, once a follower of Lombroso, was driven to criticize the anthropological teachings of his former master. Recognizing their inadequacy, Ferri

set out to modify them by including the effects of the social environment in the genesis of criminal conduct. Any crime, he declared, must be regarded as the product of natural tendencies inherent in, and the social circumstances of, the delinquent.

The dual origin of criminality in *environment* and *heredity* as postulated by Ferri is the basis of the doctrine of the modern "bio-sociological school." It points the way by which the problems of the anti-social individual must be attacked. Criminology is something more than a subject of great academic interest. It is an aspect of sociology from which lessons of practical value may be derived for the betterment of social life.

The present century has witnessed a growing collaboration between psychologists and students of social affairs. It is seldom that the latter are in a position to undertake the work of psychological research for themselves, and they have, therefore, to accept the teachings of the psychologists more or less as they stand. As far as the problems of social maladjustment are concerned, psychology has been able to throw much light upon them, in so far as it has disclosed the genesis of human motives and conduct. The relationships between members of a social group are based upon thoughts and feelings, which in their turn are determined by the conditions under which the mental machinery of the individual develops in infancy. The problems of conduct must be approached from the angle of instinctive desires and their satisfaction or frustration in the first impressionable months of life.

Of the physical causes of social misfits, from imbeciles to drug addicts, much is known, and certain measures of adjustment and prevention can be taken. But society is also responsible for the production of mental maladjustment in its members, and this may have deleterious effects on the social structure as potent as those deriving from the first-mentioned causes.

Although society is, at least superficially, maintained

by common aims and loyalties, there are present at all times disrupting forces which tend to split men into opposing groups, fomenting social hatreds, antagonisms, and upheavals. Such disturbances can be traced throughout history, and we have learned to accept them as the natural and inevitable consequences of man's upward striving towards better things.

The psycho-analysts of the Freudian school look for the causes of dissension and revolt in the sub-conscious levels of the mind. During the first year of extra-uterine life the behaviour of the child is motivated by innate needs or drives. The degree of satisfaction or frustration of these impulses is in the main determined by parental, chiefly maternal, restrictions imposed upon them. "Such restraints on conduct are believed to be dealt with by that component of the mental structure concerned with ethical behaviour, called by some the "super-ego," and by Dr. Julian Huxley (*Evolutionary Ethics*, 1943) the "proto-ethical mechanism."

Through the operation of this "mechanism" the moral sense, the consciousness of the difference between right and wrong, is supposed to be developed. According to the psycho-analysts, the element of *hate* derives from maternal opposition to the expression of inborn infantile impulses, but the element of *love* normally overcomes that of hate. The effects of the child's experiences are carried over into adult life, and may colour the whole personality of the individual. As Dr. Emanuel Miller ("Neurosis and Civilization" in *Human Affairs*, 1937) has succinctly observed:—

"The first judgment in childhood becomes a perpetual last judgment which may endure a lifetime, influencing every social contact that we make."

Thus Lombroso's original Criminal Man has become a much more complex creature than that great thinker could have guessed. Even the environmental influence has become enlarged beyond the imaginings

of Ferri, to include the experiences of the individual in the first few months of life; for not every criminal can plead poverty or suffering in extenuation of his acts.

Tentative inquiries have been made, we believe, in America, into the possible connections between endocrine imbalance and anti-social tendencies, and there have followed hints, if nothing more, that the future treatment of the habitual offender against the law might consist in an alteration in the activity of the ductless glands by surgical or injection methods. However, the contemplation of these possibilities carries us a long way into the future. For the present we take note of what seems to be significant in the modern approach to the anti-social individual, and that is the emphasis being laid upon the influence of factors *beyond the control of the wrong-doer* in determining the pattern of his behaviour within the community.

SOCIETY AND HEALTH

WHETHER we regard society as an organism or not, it will be evident that its state of health in terms of efficient organization, productive capacity, and intellectual vigour will at bottom depend on the physical and mental health of its constituent men and women. The health of the individual can never remain his concern alone, for his disabilities must inevitably affect, directly or indirectly, the activities of the community to which he belongs.

The health of the individual is very largely determined by the conditions of life imposed upon him by society, for membership of a community carries with it certain risks from which it is impossible to escape. The study of health and the effective treatment of its disorders were the first concerns of medical science. There followed inquiries into the social causes of disease and its repercussions on social progress. From all this there emerged the speciality called social medicine.

The health of a nation or other community is no more than the average level of fitness of its members. The idea of a *public* or *national* health, as distinct from personal health, is no recent one, for it can be traced back to the sixteenth century, and probably a good deal earlier. In ancient times men learned to distinguish between the normal functionings of the body and their disordered states. The latter they sought to explain in various ways, generally by reference to the whims of spirits or gods by whom natural events were believed to be controlled. They tried to relieve or cure diseases by the only methods which seemed reasonable to their superstitious, untutored minds: by the recitation of mystic phrases, propitiatory offer-

ings, and the application of loathsome mixtures to the body.

Throughout the Middle Ages progress in the understanding and treatment of disease was retarded by the paralysing effects of fanatical and irrational beliefs, witchcraft, and magical rites associated with astrology. It was not until the seventeenth century that medicine shook itself free from the restraints heaped upon it by ignorance and fear. Even so, in the transition period of the previous century there are to be noted a few pioneers, like Linacre, Caius, Vesalius, and Thomas More, whose breadth of outlook did much to hasten the initiation of a new, rational approach to medical problems.

More's *Utopia*, published in 1516, and inspired, it is thought, by the *Republic* of Plato, contained a statement of the essential conditions upon which More believed that personal and public health ought to be based. The full and vigorous enjoyment of life was to be the predominant aim of the citizens of Utopia. His faith in the value of such things as municipal cleanliness, properly equipped hospitals, care of mothers and infants, the provision of free education, attention to the rules of hygiene, and the welfare of industrial workers, has a singularly modern touch. It has taken something like four hundred years to convert More's dream into a reality.

Social conditions of the eighteenth century were such as to give direct encouragement to disease, brutality, and immorality. Maternal and child mortality rates were excessively high; smallpox was prevalent, and alcoholism rife. Insanitary and degrading conditions of life and work were the common lot of the poorer classes.

Gradually attempts were made to combat disease and premature death. Edward Jenner, after a long period of experiment and thought, introduced the process of vaccination as a protection against smallpox. This marked the beginning of the practice of immunization, which has since been applied to the

control of many other dangerous diseases. The causes of the high death-rate among mothers were the subject of investigation by Drs. William Smellie and William Hunter, and Mr. Charles White. A large proportion of the chronic diseases common in this period was attributed to the intemperate habits of the people.

It can well be imagined that there was ample stimulus in prevailing conditions to lead physicians and social reformers to devote their energies to the task of saving humanity from the consequences of the mechanization of industry, man's brutality to man, greed, alcoholism, faulty dietary habits, and the exploitation of the weak and poor by the wealthy and privileged members of the community. Great strides were made in the development of a rational view of the nature of disease. Here John Hunter played a significant rôle. Through him disease came to be recognized not as the mark of a malevolent spirit harboured within the body, but as the manifestation of a disturbance of normal function or growth. It was regarded biologically when the influence of the environment came to be accepted as a determining factor.

We have already referred, in connection with humanitarianism, to the beginnings of investigation into the medical aspects of industry during the eighteenth and nineteenth centuries. From time to time Acts were passed providing for the protection of industrial workers, as well as for the maintenance of public wash-houses, the removal of "nuisances" prejudicial to public health, the pipe-supply of pure water, sewage disposal, the notification of certain infectious diseases, the inspection of food and drink, the cleansing of verminous persons and premises.

But despite the advances that were actually made in these directions by legislation, reform was neither rapid nor complete. Many enactments were too limited in their scope and requirements, leaving loopholes through which individuals and local authorities

could escape their responsibilities. Furthermore, it was not until about the middle of the nineteenth century that the medical profession was recognized by the State as having any legitimate part in the framing and administration of public-health laws. After this the evolution of public-health services, of social and industrial medicine, went on apace.

In 1869 a Royal Commission prepared a statement on the essential conditions to be observed in the maintenance of a civilized social life. It dealt with all aspects of public hygiene as then envisaged. In 1929 the provisions of the Commission were extended to embrace town-planning, the welfare of industrial workers, the care of the health of children, the school medical service, national health insurance, and the education of the public in various aspects of hygiene. All such schemes are now administered by the local authorities with the supervision and financial assistance of the State. The social services—poor relief, unemployment insurance, reformatory and industrial schools, and education—while not directly medical in nature, contribute in large measure to the enhancement of the health of the people.

The study of infant welfare has been vigorously pursued during the present century. It was called for by the persistently high death-rate among infants, especially those under one year, in the last century. In the course of the last forty years every effort has been made to remove those conditions which it was believed were responsible for the high rate—viz., ignorance of mothers, inadequate food, and unhygienic surroundings.

The instruction of mothers and girls in mother-craft and domestic hygiene, the setting up of clinics for the dispensation of advice on matters of child management, feeding, and clothing, have doubtless contributed to the marked improvement in the infant mortality rate under one year, which has been more than halved since the 'nineties.

An important institution of the present century is

the school medical service, which came into being as a result of numerous inquiries into child life. These revealed, among other things, the presence of malnutrition and the undesirable effects of premature employment.

With the recognition of the fact that the child of to-day is the citizen of to-morrow came the desire to take active steps in the promotion of the well-being of the young by physical training, the supply of school meals, and medical inspections to detect early the presence of incipient disease. Thus as a branch of preventive medicine the school medical service is performing a valuable function in the elevation of the mental and physical fitness of man.

We should note also that within the classroom itself children are instructed in a simple manner in the rudiments of hygiene. Quite early they are able to assimilate the elementary facts of personal cleanliness, and to understand the need for the development of good habits both for their own benefit and for that of the community in which they must in due course take their rightful places.

Health is now looked upon as a possession of the community to be cultivated and safeguarded. A larger view of man's health and its foundations, of the factors, both personal and social, which help or hinder its advancement, is before our eyes. Curative medicine has become in course of time subordinate to preventive medicine. Even now the emphasis is surely passing from purely preventive measures to the need for a plan by which the standard of health enjoyment may be raised above that denoted by a mere freedom from disease.

It is recognized that there is a minimum of health and fitness the possession of which enables the individual to live just outside the need for medical care. Therefore we are prompted to consider what potentialities of mind and body may yet lie unrealized, awaiting expression in thought and action with the raising of this minimal standard of well-being. To

quote the words of the British Government's White Paper (1944) dealing with the proposed new National Health Service:—

“Perhaps the most important point of all is the need for a new attitude towards health care. Personal health still tends to be regarded as something to be treated when at fault, or perhaps to be preserved from getting at fault, but seldom as something to be positively improved and promoted and made full and robust.”

In 1926 there began an interesting experimental study of health problems with the establishment of the Pioneer Health Centre at Peckham.¹ After a modest start it entered in 1935 upon its second stage, when a large building of modern design was erected, fully equipped with all the facilities for medical examinations and consultations, for recreation and social intercourse.

At this Health Centre a quite unique approach to health and life was envisaged and followed up. The traditional conception of the *individual* as the unit or organism was replaced by the *family* or man-woman synthesis (with or without children). A broad biological outlook on human health problems was assiduously cultivated by those responsible for the organization of the Centre. The remarks of Dr. I. H. Pearse and L. H. Crocker, joint authors of *The Peckham Experiment: A Study in the Living Structure of Society* (1943), are worthy of notice:—

“In the coming years we are all going to discover that we must either learn to understand and live in obedience to the laws of biology—the science of living—thereby coming to live more abundantly; or that by ignoring them our misfortunes must multiply till, heaping up, they ultimately destroy man's civilization—and even man himself.”

¹ The Peckham Health Centre resumed activities in March, 1946, after being closed down at the outbreak of war in 1939.

A new "right" of man now demands our attention; it is his right to health, to positive health. For long the advances in medical science, bringing with them more and more costly methods of treatment and diagnosis, have tended to place their benefits beyond the reach of all but the well-to-do. Now it is becoming clear that every man and woman ought to be able to avail him or herself of medical techniques, whether or not they have been developed by the use of public money.

The scope of medical research to-day is enormous. Its inquiries extend beyond the confines of the laboratory into the fields of public hygiene, health in the factory and school, climatic influences, nutrition, epidemics, and so forth.

Much of this research is organized and maintained under the direction of the Medical Research Council, which was established in 1919. Its grant-in-aid from the Government, together with other moneys, amounts to some £220,000 per annum. Part of this sum is used in maintaining the National Institute for Medical Research at Hampstead, and part is expended in financing research units in hospitals and individual research workers in various parts of the country.

The M.R.C. thus lends invaluable aid to the investigation of such matters as tropical diseases, cancer, tuberculosis, rheumatism, venereal diseases, and of many other problems of pathology which have important bearings upon society.

In opposition to health there works what Aleck Bourne (*Health of the Future*, 1942) has called the "quadruplet curse of the kind of civilization which Western man has chosen to build"—poverty, ignorance, insecurity, and boredom. The attack on the problems of personal and national health must, on the sociological side, begin with the institution of measures to remove these fundamental, crippling evils. Only then will the rich contributions which medical science can make to social needs become fully employed in the service of humanity.

CHAPTER SEVENTEEN

BREEDING BETTER MEN

EVERY man owes his characteristics of body and mind to two sources: the hereditary factors provided by his parents, and the circumstances in which he is reared from the moment of his conception. We are concerned in this chapter with the first of these sources.

It is evident that the betterment of human society, by giving attention to the environment in which its members are nurtured, will fail as a project unless due consideration is given to hereditary factors which contribute weak minds and puny, diseased bodies to the State. These must be studied and, if possible, subjected to some kind of control. Such work belongs to the eugenisists, whose aims fall naturally within the framework of sociological research.

The view that it is within human skill to improve racial qualities by controlling the breeding of men and women was held by the Greeks some two thousand years ago. Plato dealt with the matter in his *Republic* and *Laws*, and developed the idea of a highly perfected form of society—a utopia. (Sir Thomas More applied the name Utopia to his ideal island of happy people described in his romance of 1516.) Aristotle also gave much thought to the subjects of marriage and procreation in their bearings upon the welfare of the State.

Although we no longer expect perfection in the social or any other sphere, and employ the term "utopian" only in criticism of extravagant or over-optimistic aims, the belief is still strongly held that the human species may be improved by prudent mating. The idea of practical race cultivation, it seems, vanished with its Grecian advocates, and did not again appear as a part of sociological thought until

after the lapse of many centuries, when in the second half of the nineteenth an interest began to be taken in human heredity in England and the U.S.A.

In this country Francis Galton, as a result of observations on inheritance of mental ability in men at Cambridge University, contributed in 1865 two articles to *Macmillan's Magazine* dealing with "hereditary talent and genius." In them Galton gave expression to his views on eugenics—the study of race cultivation.

In his book *Human Faculty*, published in 1883, Francis Galton first used the word *eugenics*. Then at the beginning of the present century he gave before the Anthropological Institute and the Sociological Society an account of his ideas for the improvement of the human species by wise breeding. In an earlier work, *Hereditary Genius* (1869), Galton wrote with critical indignation of what appeared to him to have been the anti-eugenic policy of ecclesiasticism in Europe. He observed that:—

"Whenever a man or woman was possessed of a gentle nature that fitted him or her to deeds of charity, to meditation, to literature or to art, the social condition of the time was such that they had no refuge elsewhere than in the bosom of the Church. But the Church chose to preach and exact celibacy, and the consequence was that these gentle natures had no continuance, and thus, by a policy so singularly unwise and suicidal that I am hardly able to speak of it without impatience, the Church brutalized the breed of our forefathers. She acted precisely as if she had aimed at selecting the rudest portion of the community to be, alone, parents of future generations.

"The policy of the religious world in Europe was exerted in another direction . . . by means of persecutions which brought thousands of the foremost thinkers and men of political aptitudes to the scaffold, or imprisoned them during a large

part of their manhood, or drove them as emigrants into other lands. . . . Thus, as she brutalized human nature by her system of celibacy applied to the gentle, she demoralized it by her system of persecution of the intelligent, the sincere, and the free."

The year 1904 saw the foundation of a laboratory for the collection and study of data relating to human heredity. Four years later the Eugenics Education Society came into existence for the purposes of discussion and the dissemination of knowledge concerning the aims and possibilities of race betterment.

In America eugenics grew out of the first studies of heredity about 1875. Robert Dugdale investigated the notorious Jukes family, which, as all the world knows, produced such an appalling series of degenerates, criminals, and mental defectives. Loring Moody of Boston proposed in 1881 the setting up of an Institute of Heredity, but owing to his untimely death the project was not realized. Some thirty years later (1910) an organization was established, under the chairmanship of Dr. David Starr Jordan, to deal with eugenic problems. The secretary was Dr. C. B. Davenport, one of America's pioneer investigators of heredity in man.

The discovery in 1900 of Mendel's plant-breeding experiments and their results was followed by an increase in the experimental study of plant and animal breeding throughout the world. The progress of twentieth-century researches in heredity has been such as to provide many valuable indications as to how far we may expect schemes for race betterment to be successful if and when we embark upon them. It has been made abundantly clear that the laws of variation and inheritance apply as much to man as to lower organisms; that is to say, human qualities are passed on from parent to offspring in definite and generally predictable ways through the medium of the chromosomes in the reproductive cells.

The eugenics programme has a threefold basis: Research — Education — Legislation. Research provides the material facts on which later progress must depend. Education provides the means whereby the public may be made aware of the results of research and of the aims of the eugenist. In thus preparing the minds of the people, education paves the way to future reform and legislative control of procreation.

In America some progress in the fulfilment of the eugenics programme has been achieved. In the State of Wisconsin, for instance, men and women wishing to marry are required to obtain a doctor's certificate of good health as a preventive against the birth of defective children. In other States sterilization of the feeble-minded and of imbeciles has been instituted in order to prevent their reproduction.

Great Britain is still in the research stage, and although information on the subject is available in books and periodicals, it is given little attention by the great majority of people, who would almost certainly view the prospect of a State control of their reproductive capacities with suspicion and hostility.

Eugenics starts from a biological foundation, a physiological process that is common to all living things. But in its application to human affairs it becomes a part of sociology. The control of human fertility is the practical starting-point of race betterment. Its aim is to limit the reproductive activity of persons possessing socially undesirable qualities. That is *negative* eugenics. On the other hand, the encouragement of people with obviously valuable physical, mental, and moral characteristics to have children is *positive* eugenics.

It is in the determination of precisely what constitute socially valuable qualities that the eugenist finds one of his most difficult problems. There exists no scale of values by which people may be assayed in regard to their eligibility as parents, and it is unlikely that one will be devised until we have advanced a great deal farther along the path of human genetics.

For the present it is agreed that there are three categories of persons whose fertility it seems desirable to restrict. First, those suffering from, or known to be carrying the factors for, hereditary diseases and defects. Second, those comprising the so-called "social-problem group"—viz., people who themselves or their offspring are feeble-minded and of immoral tendencies. And third, those persons who are merely of subnormal intelligence.

The programme of race betterment is likely to be obstructed by two factors. The first is the marked success with which infant life has been preserved by pre- and ante-natal care, and the raising of the standard of family and public hygiene. Nowadays a large proportion of weaklings is saved and reared, whereas a hundred years ago they would almost certainly have perished. Some 40,000 infants are saved each year who prior to 1910 contributed to the infant mortality rate.

It may reasonably be argued that a frail baby is just as likely to turn into a good citizen as a robust child is to develop into a socially useless one. There is, of course, no hard-and-fast rule to be applied to these matters, but the general tendency seems to be for weakly children to pass on, when they reach maturity, their hereditary constitution to their offspring. The words of Sir George Newman (*Health and Social Evolution*, 1931), the national health expert, are worth noting:—

"Thus the physical standard of the younger generation is imperilled in some degree by our successful saving of infant life and by an unselected birth addition. The two factors have been in operation for a generation, and some of our problems are profoundly affected by them. Some of the high maternal mortality, some of the physical unfitness of the pre-school child, some of the persistence of ill-health in school-life, some of the excessive sickness certified under the health

insurance system, some of the increased incidence of mental defect, of rheumatism, of nervous disease and instability, and of tuberculosis in young women, may arise as the result of this birth and survival of the unfit."

The second factor operating against eugenic aims is provided by the humanitarian and religious attitudes of mind which are brought to bear upon most proposals for the control of fertility and the elimination of obviously defective babies. Human life is sacrosanct. However useless and abnormal the new-born child may be, religious scruples forbid its destruction. It must be reared with the same care as a healthy infant, in spite of the fact that it will be throughout its life a mere parasite on its relations, or demand the care and attention of paid nurses in a State-aided Institution.

While the practical aspects of race cultivation are in the hands, and dependent on the will, of the people, it is unlikely that any useful progress in eugenic reform will be achieved. There remains the possibility of employing methods of breeding worked out by medical men and biologists, of a kind similar to those now being used in the production of high-grade cattle and food-plants. For instance, the artificial insemination (euteleogenesis) of women has been tried with success, although condemned as unnatural by the Churches. It makes possible the bringing together of two hereditarily desirable lines or stocks without actual physical union between the sexes. It marks a step towards the ultimate control and regulation of procreation. The present difficulties and ethical objections confronting the practice of euteleogenesis need not be enumerated.

A vision of the future is the ectogenetic production of children. This was outlined twenty years ago by J. B. S. Haldane in his little book *Dædalus, or Science and the Future* (1924). Simply stated, it would involve the fertilization of human ova by spermatozoa outside the body, and the subsequent rearing of the embryos

in some kind of artificial medium providing food, oxygen, and warmth to the stage at which they would normally be born. The time, however, is very far distant when ectogenesis will be practicable as far as the human species is concerned, but that it will be achieved there is no sound reason to doubt. By that time, it may be surmised, present religious and sentimental objections to interference with a natural process will have been eradicated.

A point of immense importance to the eugenist is that he should have some idea of the kind of world or environment in which his greatly improved race of men (if produced) is to live. It is possible that the process of race cultivation may advance more speedily than improvements in the social system, thus leading to a state of affairs in which a superior body of men and women are frustrated by the demands of an inferior social order.

However, having regard to the extreme slowness with which the eugenic programme will almost certainly be realized, it is probably safe to assume that race and environment will undergo a concurrent and mutually beneficial improvement.

PART FIVE

MAN IN NATURE

I am a part of nature, and, like other natural objects, from a lightning flash to a mountain range, I shall last out my time, and then finish.—J. B. S. HALDANE.

CHAPTER EIGHTEEN

THE WEB OF LIFE

So far we have been mainly concerned with the several aspects of *Homo sapiens*, with his organic, mental, and social attributes. This must be balanced by a glance in the opposite direction, as it were, in which man may be seen in his entirety as an integral part of a larger, more comprehensive natural system of change, struggle, and co-operation.

A deepening analysis of an object quite commonly gives rise to a sense of unreality in connection with that object. Matter that has been described by the physicists in terms of molecules, atoms, and electrons seems to bear no relation to matter with which we come into daily contact: food, clothing, the furniture in our homes and offices. Likewise, the human organism analysed in terms of chemical reactions, nervous impulses, gland secretions, conditioned reflexes, and the rest, seems to be a vastly different kind of living thing from the man or woman with whom we talk, or work, or play games.

The reason for this, it would seem, is that while by the employment of scientific methods we can analyse things in ever greater detail, we do not in our ordinary lives perceive or experience the effects of isolated properties, but only of the whole. It is a necessary condition of our intellectual lives that we should be cognizant of the detail yielded by analysis, so that we

may have an intelligent regard for our perception of the whole.

A great deal has been written on the subject of man's place in Nature and the Cosmos. It is a subject that offers a wide field for the play of individual preferences and opinions, for the elaboration of philosophical and theological theories. In this chapter and the next it is proposed to consider only what may be described as first principles, in an attempt to provide a basis for future study.

The quotation from the writings of Professor J. B. S. Haldane which introduces the fifth and final section of this book may be taken as a simple, business-like statement of man's relationship to nature. It implies neither the exaltation nor the derogation of man. It envisages him as a product of natural forces, as subject to the fundamental rules or laws of nature, as returning to the "bosom of the earth" when his little spell of life is done.

It is a hard thought, but man is an insignificant creature when seen against the background of cosmic immensity, when viewed in relation to the gamut of organic change and upheaval, the profusion of life's struggles and harmonies. He inhabits the world in company with something like a million other species of animals, to say nothing of a great variety of plants. With these he attempts, with varying degrees of success, to live in some sort of concord. There is nothing to indicate that nature has a special regard for the human species; mankind is not absolved from the necessity of expending energy in adjusting itself to the living environment. According to Dr. Robert Morris (*Fifty Years a Surgeon*, 1935):—

"People forget that Nature is always watching for opportunity to allow her microbes to grow, and so far as anybody really knows, is quite as much interested in the welfare of a streptococcus as she is in any anthropocentric philosopher who is convinced that the world was made for man

and possibly for himself in particular. . . . When it comes to a test, we learn that the microbe is final winner over all animal life and all plant life. The last living thing on Earth will almost certainly be a microbe."

In a strict sense there is no such thing as a solitary organism. The activities of plants and animals and man are interrelated in a vast and complicated system of life which has superficially the appearance of being in a state of balance, yet which is, below the surface, seething with perpetual disturbances and re-adjustments.

This condition of things has been called the "balance of nature," and the whole system of animal and plant relationships upon which the balance of nature is supported is referred to as the "web of life." It is as a component thread in that great web of life that we must learn to regard the human species. The satisfaction of an appetite, the fulfilment of a desire, the performance of an action, sets up a ripple of disturbance that travels through the strands of the web, affecting other lives often in ways so subtle that we are quite unconscious of them.

At one time philosophers tended to emphasize the uniqueness of man in his apparent detachment from the world of lower creatures. Science has since revealed a rather different picture of him as an organism irrevocably caught up in a network of organic processes operating according to specific "laws."

When man began his march towards modern conditions of life, in which fuel-burning machinery, rapid travel and transportation, the concentration of large numbers of people within relatively small areas are among the dominant characteristics, he little knew that he was about to initiate a profound disturbance in the balance of life the effects of which would spread into almost every sphere of human endeavour.

From factory chimneys smoke polluted the air,

forming an atmospheric blanket cutting off the rays of the sun. This retarded plant growth and the development of children brought up in industrial areas. It also assisted the multiplication of bacteria. Rats and lice were unwittingly provided with favourable conditions for their propagation and dissemination, carrying with them the threat of disease. World travel and communication encouraged the spread of parasites once restrained by geographical barriers. The development of industries has also increased the population of the world. Such an increase means more consumers of food and other commodities, leading to nation-wide changes in the conditions under which people live and work.

The amount of material available in the world for nutrition and growth is limited. It seems to be inexhaustible only because it is used over and over again. Year after year new individual plants, animals, and human beings are produced. From the first moment of their existence to the final one of death they are the consumers of the world's material resources: oxygen, water, and carbon compounds. Throughout their lives portions of their environment are transformed into the living tissues of their bodies. At the same time chemical processes within the tissues are constantly forming waste products which during elimination return to the environment, to be once again converted, by the beneficent activities of bacteria, into useful foodstuffs.

Man himself is involved in, and dependent on, the constant and universal passage of the elements—carbon, hydrogen, oxygen, sulphur, nitrogen, and many others—from one chemical association to another, from one place to another, through the physiological needs of living things. The growth and vitality of the individual, first as an embryo, then in turn as child, adolescent, and adult, are maintained by the assimilation of chemical compounds derived from food which may be plant or animal tissue, or substances manufactured by them.

So the human organism is made up of a great many materials brought together by some unique alchemy, ultimately giving expression to the characteristic powers of man's body and mind. With these powers he has devised the technique of disturbing the balance of nature and re-establishing it to his own benefit. This has gone on ever since man learned the arts of hunting, plant cultivation, and stock-breeding.

For a very long time now man has been able to support his species on numerous sources of food, sources which he has expanded by careful selection and planned cultivation. The production on a huge scale of grain, roots, and tubers, and other plants of economic importance like tobacco and cotton, has at the same time furnished many organisms, such as fungi and insects, with abundant food and the chance to multiply at a prodigious rate. Thus arose the menace of pests and plant diseases which mankind, for its own security and survival, has been forced to attack by physical, chemical, and biological devices.

Furthermore, man's efforts to obtain large yields of food from the same land year after year led automatically to an impoverishment of the soil, owing to the extraction therefrom of mineral foods by the plants. This systematic removal of vegetable matter reduced the natural production of humus which goes on when plants die and decay undisturbed in the ground. Scientific thought eventually revealed the evil consequences of this practice, and man learned to right the balance of nature, which he had upset, by a system of crop rotation, planting clover every three or four years, scattering fertilizers, and allowing the land to lie fallow in order to enable the soil-bacteria to get on with their useful work of building up nitrogenous foods from the atmosphere and the products of decay.

The point that emerges from these brief observations is that the life of man, and all that we associate with it, is intimately bound up with the organic processes of nature; man is part of them, and can have no existence apart from them. But death does not

set him free from the courses of life. He remains a substantial though passive part of the web of life, a factor in the balance of nature.

Cultural developments, it is true, have interfered to some extent with the natural fate of the human body, which is to decay and return its chemical constituents to the earth, to be the physical basis for future plant and animal life. This return of the material organism to circulation in nature, in which the calcium, phosphorus, iron, and nitrogen, etc., of the bones, blood, and other tissues become built up into the living cells of vegetable organisms, is the only form of immortality of which we have any certain knowledge. Erasmus Darwin realized this when he wrote:—

“Hence, when a monarch or a mushroom dies,
Awhile extinct the organic matter lies,
But as a few short days or years resolve,
Alchemic power the changing forms dissolve;
Emerging matter from the grave returns,
Fills new desires, with new sensation burns.”

Cremation, a process by which a corpse is rapidly converted into a few pounds of mineral matter, delivers some volatile substances to the atmosphere, while the remaining ash is collected and preserved in a sealed receptacle. This custom effectively prevents the natural dispersal of the body's mineral elements. Occasionally the ashes are scattered over a selected area, and then in a real sense the body returns to earth “whence it was dug.”

A certain sanctity has for long ages been associated with the human body after death. Its disintegration or artificial destruction is still vaguely regarded as interfering with its ultimate resurrection. It may be that a thousand years hence men will have come to accept a radically different view of the value of the human body *post mortem*, and will see as a natural and beneficial process its ceremonial return to earth, there to enter once again into the endless travail of life.

Under natural conditions there is both competition and co-operation between one form of life and another.

Struggle and destruction seem to predominate in nature, yet co-operation and mutual aid may be discerned in the manifold relationships between living things. These are, on the whole, less conspicuous than the former, and so the ill-informed are prone to associate "life in the raw" with endless slaughter and destruction.

The balance of nature in which, as we have seen, man is irrevocably involved emerges out of the simultaneous operation of constructive and destructive forces. There is a fundamental give-and-take running through all the phenomena of life.

It is not always easy to see with our man-centred eyes the constructive and co-operative tendencies. Many thinkers have seized upon the more obvious destructive aspects of nature as guides to the interpretation of man's war-like proclivities. They argue that war is a biological and a social necessity, being an effective method for the weeding out of the weaklings who cannot hold their place in life, in favour of the strong and vigorous who can. The following passage from Dr. William Inman (*Biological Politics*, 1935) is typical of this school of thought concerning war:—

"War, in its wider meaning as a kind of conflict between living organisms, is inescapable, as this kind of conflict is a vital part of the mechanism of life. All living organisms, both animal and vegetable, are perpetually at war with the millions of different forms of micro-organisms that live in the earth, water, and air. Larger forms of life, such as beetles, worms, and parasitic insects of various kinds, are all liable to carry on a very sanguinary campaign against both men and animals. It is hardly possible to draw an artificial line between these wars and the conflicts between different societies of men."

In such a view as is expressed in the above statement there is insistence only upon destructive effects. There is no reference to the other side of the picture, in which

we can recognize, for instance, the valuable services of those same micro-organisms in converting certain forms of matter into food for the animals and vegetable organisms with which they are "perpetually at war."

The application of biological ideas and principles wholesale and without modification to human problems is a dangerous practice. War has become to many people inevitable because there is fixed prominently in their minds the idea of a struggle for existence in which the more powerful nation will conquer the weaker. The idea of the existence of a balancing co-operative urge has not received its due recognition.

The researches of Professor W. C. Allee, and his assistants, of Chicago University, performed in recent years have revealed the presence of an *unconscious automatic co-operation* at work in the lives of many different types of animals, from the microscopic organisms to insects and vertebrates. This co-operative urge is of a kind that can be discerned only by careful and exact experiment, and Professor Allee has already been able to apply some of his findings to the study of some of the modern problems of man's social and international relationships.

The principle of co-operation applies among asocial as well as among the recognizably social animals such as ants and bees. This unconscious urge towards co-operation is not a new or recent factor in evolution, but is to be detected even in the simplest organic forms. Professor Allee (*The Social Life of Animals*, 1938) asks if the basic principles of struggle and co-operation can be made to work together in the international relations of men. His conclusion is hopeful and encouraging. He writes:—

"In our struggles with our physical environment, with disease germs and insects, we have ample opportunity for the struggle for existence, and stimulus enough to apply to the limit the principle of co-operation."

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MAN, NATURE, AND RELIGION

WE have seen that as an animal organism man is an integral part of the web of life which is itself bound up with the cosmic process through the conversions and transformations of matter and energy. Man not only reacts physically to his immediate environment; he also reacts psychologically to the awareness of his relationship to nature as a whole, and this he does through the medium of religion.

Man's peculiar mental powers enabled him long ago to visualize mysterious "forces" operating in his surroundings. He saw imaginatively the work of these forces in the automatism of living things, in seasonal growth and decay, in animal behaviour. Later he believed that they were at work in the control of his own life and existence. These forces became personified into spirits and gods.

From the primitive concept of many gods, some friendly and others evil, man turned ultimately to the belief in a single god who was not only the controller of the universe, but also its creator. All this was a reaction of the human mind to certain parts of experience, and it is this reaction we refer to when we speak of the religious sentiment—that is to say, the feeling of a need for worship, for communion with the deity.

Beginning as a personal emotional experience, the religious sentiment has become a social force. It has become overshadowed by doctrine and ritual that have all but obscured the motive that originally inspired them. The theologian, accepting the Bible as inspired by God, and therefore revealing His plan, has worked out from it in detail all God's ideas, wishes, likes and aversions, feelings, sorrows, and hopes. He has further attempted to invest every aspect of human

experience—love, pain, suffering, pity—with purposes conceived by the Master Mind.

The laws or rules on which the processes of nature appear to be based are common ground for the exercise both of religious and scientific thought. The attitudes of science and of theology towards natural laws are fundamentally conflicting. While science seeks only to discover these laws and to interpret natural phenomena in terms of them, theology not only claims that they are the "rules" by which the Creator decided that the universe should be governed, but also that He can at any time suspend their operation. When this happens it is claimed that a miracle has been performed.

Science is very cautious in its regard towards miraculous and other extra-normal events. That happenings for which no ordinary explanations can be given do occur is not to be doubted. They are facts of experience, but the utmost care must be exercised in attempting to account for their causation. It is easy to assume that a phenomenon which cannot be explained on well-established principles of cause and effect must be the work of a supernatural agent. This has been done times without number in the past. Our own century is not without its remarkable phenomena, among which miraculous cures are outstanding. These are not only interesting in themselves, but are also powerful supports for revealed religion.

In the case of the miraculous healing of organic lesions of long standing we come face to face with a phenomenon that calls for no darkened rooms, trances, or psychically sensitive mediums. If we accept the published records as true statements (and there appears to be no reason why we should not), then it seems clear that in certain people under certain conditions the normal processes of tissue repair and functional readjustment may be speeded up to such a degree that healing is, for all practical purposes, instantaneous.

Such cures are certainly infrequent; and most, but

not all, of them have been observed at Lourdes. The Medical Bureau des Constatations was established there in 1882 to examine alleged miraculous cures. At the office of this Bureau are kept the case-records of all healings which have been certified by examining doctors as supernatural. More than 150 different kinds of diseases have been dealt with by this organization. Any physician of any creed is at liberty to observe patients brought to Lourdes, and to scrutinize the medical records.

Instantaneous healing is a problem for which at present there is no natural solution. Dr. Alexis Carrel (*Man the Unknown*, 1935) has made a study of the subject since 1902, and writes of it thus:—

“ Despite their small number, they [miraculous cures] prove the existence of organic and mental processes that we do not know. They show that certain mystic states, such as that of prayer, have definite effects. They are stubborn, irreducible facts, which must be taken into account. The author knows that miracles are as far from scientific orthodoxy as mysticity. The investigation of such phenomena is still more delicate than that of telepathy and clairvoyance. But science has to explore the entire field of reality.”

Instantaneous cures belong to that group of phenomena termed paranormal, to which also, as we have seen, belong telepathy and previsions, etc. The characteristic common to them all is that they evade or transcend natural laws. In the absence of any scientific or objective explanation of their occurrence, theology is free to place on them any interpretation it pleases. It therefore asserts that instantaneous cures, taking place as they generally do in circumstances of deep piety, of worship and supplication, are due to the direct intervention of God—i.e., they are supernatural.

Miraculous cures, and some other supernormal

happenings, are commonly associated with the Roman Catholic Church. There is, for instance, the case of the stigmatic Theresa Neumann of Konnersreuth, who has for many years borne the marks of Christ's wounds, which bleed every Friday. She is said to have frequent visions of the Crucifixion. She never eats or drinks! Another stigmatic, a priest, lives in Italy, and is reported to have been visited by Catholic soldiers during the recent campaign against the Germans in that country. In Genazzano, near Rome, there is stated to be a "miraculous picture" of Our Lady of Good Counsel which after making a sudden appearance in 1467 hangs *without support* upon a chapel wall.

It is perhaps fortunate that in considering these perplexing cases of evasion of natural laws we have instances of the fate of similar events in the past to assist us. Thousands of "miracles" of one kind or another were reported to have occurred during the medieval period, and many have since been considered to be almost certainly fictitious, due either to ignorance or mental aberration or to deceit.

The first reaction nowadays to supposed departures from normality in the physical world is generally one of frank scepticism. The story of the rise and decline of witchcraft,¹ described by Bromberg as the "mass delusion," with its apparent fantastic deviations from natural law, should act as a deterrent to those who may be over-ready to accept at their face value supernatural explanations of otherwise inexplicable events.

The fundamental lesson which it seems we ought to learn from the historical record is that, broadly speaking, the supernatural tends to descend sooner or later to the level of the natural by the applications of scientific method. What has happened in the past may be expected to happen again in the future: the inexplicable and mysterious will, under the steady

¹ For an interesting treatment of this subject the reader is referred to Christina Hole's *Witchcraft in England* (Batsford, 1945).

scrutiny of science, be made clear.¹ And man's traditional religious reactions to his world will almost inevitably be profoundly influenced by any agent, scientific or otherwise, that can effectively weaken belief in the supernatural.

It seems that the progress of science will be such as to make more and more untenable those interpretations of nature which have for so long been the mainstay of revealed religion. The process has, in fact, already started. Doubt cast on one aspect of religion, if upheld by sufficient evidence, is likely to stimulate doubt about the religious system as a whole. And if one portion of Scripture is demonstrably false, then the whole of it may be.

We are to-day participators in the genesis, in Western civilization at least, of a great doubt concerning the validity of the whole system of traditional theology which demands obedience to certain supernaturally revealed rules of belief and conduct. The great mysteries of the universe have long been used by the officials and servants of the Churches to impress upon the common man and woman a sense of their insignificance before the omnipotence of their Creator. It has been vital to the prosperity of the Churches that the people should not be too well informed of scientific discoveries.

Science itself once had to battle against enormous odds. Even in this fifth decade of the twentieth century modern habits of thought sustained by scientific concepts are disparaged and ridiculed by clerics, who claim that they are the root-cause of present moral laxity and human suffering. Speaking at a public gathering in March, 1944, the Bishop of Warrington, Dr. Gresford Jones, said that among the

¹ Some headway has already been made in the interpretation of certain mystical and supernatural phenomena associated with religious experiences and conversions. Psychopathic conditions and physiological disturbances appear to account for many of these peculiar phenomena. An illuminating study of the problem is to be found in George Godwin's recent book, *The Great Mystics*.

causes of the present religious situation were the spread of evolution and of mechanical discovery, which had raised hopes that man could frame his own millennium. The chief indictment, in his opinion, must be against what was called Christian liberalism, which had tended to substitute human reason for Divine revelation.

But if man's faith in the validity of the revelation of the Divine Will eventually dwindles to vanishing point, he may still experience the religious sentiment, which, as has been said, is his reaction to the sense of being part of a larger cosmic system. The traditional teachings of the Church have failed to achieve the necessary harmony between religious feeling on the one hand and secular knowledge on the other. Man's urge to "reach out towards God" is taken by Christian theologians and mystics as proof that man is imbued with some divine, spiritual faculty through which, in moments of prayer and meditation, he may effect communion with the Creator. When other religions of the world are considered, we find a similar spiritual urge manifesting itself in the devotions of their members, but with different ends in view.

We come, therefore, to the conclusion that the origin of the "religious sense" is to be found in man's nature rather than in the divine inspiration claimed and taught by Christian theology. The views of Dr. Julian Huxley (*What Dare I Think*, 1931) on this subject are worth recalling. He writes:—

"Religion, in the light of psychological and anthropological science, is seen not as a divine revelation, but as a function of human nature. It is a very peculiar and very complicated function of human nature, sometimes noble, sometimes hateful, sometimes intensely valuable, sometimes a bar to individual and social progress. But it is no more and no less a function of human nature than fighting or falling in love, than law or literature."

If we can accept this, we are able to regard the religious sentiment as a product of man's unique powers of body and mind, which in the final analysis are dependent on the construction of his nervous system. Its expression will therefore be influenced by environment—that is to say, by the physical, psychological, and social conditions under which man happens to live. That environment can modify the intensity of theistic belief is admitted by Canon A. E. Baker (*Science, Christianity, and Truth*, 1943):—

“Rural life and agricultural work make it easy for a man to believe in God, and keep religion real and living by keeping it close to everyday experience. . . . The townsman's life reminds him much less of God. His life is surrounded by, dependent on, social organization. . . . Not Nature, but human nature, is the environment with which he has to deal.”

We have here, also, a clue to the necessity felt for the provision of a more or less elaborate ritual in organized religion. The picturesque and awe-inspiring routine of worship practised in some form in most Churches, and seen at its best in the Roman Catholic Church, undoubtedly has for its purpose the deliberate creation of an environment in which the mind may the more easily attune itself to the presence of God.

Western religion demands that man shall keep before him one fundamental belief—viz., that this present life is but a preparation for a future existence which is entered upon at death. This mystical concept is vital for religion as we now know it. Yet it surely stands between man and the realization of one of his greatest ideals: the establishment of a religion of humanity in which man's progress in knowledge and social happiness shall be the supreme interest. Robert Owen and Auguste Comte visualized such a religion arising out of the insufficiency of traditional ecclesiasticism.

A few months ago an anonymous writer in the daily Press asked his readers: "If there is to be no hereafter, what possible sense can we make of this life at all?" It is a question that demands attention, for it springs, not from any deep, religious fervour, but from despair. It is symptomatic of a very general attitude towards human life which renders its possessors blind to every immediate relationship between man and nature, to real human aims and values, to the pressing needs for the alleviation of suffering and injustice, and for economic and social reconstruction. Has mankind so little claim to the benefits of man's present knowledge and understanding in the ordering of this life that such a claim can be regarded as sensible only if its satisfaction will ensure man's happiness in a hypothetical hereafter?

If man has, as part of his nature, the desire to reach beyond himself to the reverence, worship, or what-you-will of some larger power than that which he is conscious resides in himself; if men and women must have an object in the ordering of their lives which transcends petty personal ambitions, then those requirements must be satisfied. But how? That is the important question that lies at the root of present-day controversy concerning the inadequacy of revealed religion as a guide in man's social affairs.

The cleric and the theologian are in no doubt that a closer and more earnest adherence to the fundamental teachings of Christ, and the worship of a personal God, are the only sure methods of achieving harmony within the brotherhood of mankind.

The scientific humanist, on the other hand, sees in this prescription merely a return to that state of mind which for so many centuries was responsible for the tardy advancement of human knowledge and social progress. He therefore advocates a recasting of religion so that man may recognize and shoulder his responsibilities, instead of, as hitherto, ascribing all the suffering and deprivations of mankind to some mystical plan of the Creator.

In a recent broadcast address Dr. Julian Huxley said:—

“And the Humanist, however scientific, can still have a religious attitude to life. . . . He can have ideals which he feels to be of transcendent importance, and aims which he pursues with a truly religious fervour; and he must have his equivalent of theological creeds and dogmas—an intellectual framework to support his beliefs and his personality. He is sure that some things are of value in and for themselves—human decency and human dignity; experiences of beauty and of love; inner peace and reconciliation; true knowledge and noble expression.”

• (*Humanism: Three B.B.C. Talks*;
Watts, 1944.)

And now we are surely standing on the threshold of a new world of religious thought. To cross it men will need a deeper understanding of themselves and their potentialities, of their true place in nature as products of an evolutionary process in which *Homo sapiens* counts in the end for no more than an ant or a jelly-fish. But they are rarely nurtured in the atmosphere of such facts and principles. Instead they begin life with a set of *nth*-hand dogmas and preconceptions which they are taught it is dangerous to dispute. What chance of robust growth has a religion of mundane utility in such a soil?

Yet a religion based upon rational requirements, centred upon human interests and aims, is before man's mind. Religion is not immutable; it has suffered changes in the past, and will doubtless do so again. Meanwhile some comfort and hope may be derived from the opinion of Professor A. N. Whitehead (*Science and the Modern World*, 1925) that “a clash of doctrines is not a disaster—it is an opportunity.”

CHAPTER TWENTY

REVIEW AND CONCLUSION

THE foregoing chapters represent the records of an inquiry. It has ranged over a wide field and touched upon many phases of human life, thought, and experience. It remains now only to put down some concluding observations, and then we have done.

The human species is but young—a comparative new-comer to the organic world. Through his unique perceptual and intellectual powers, man has, in his brief period of existence, transformed the face of the earth.

Apart from moments of stagnation, there has been steady progress in the organization of society through the increase of knowledge. This knowledge has been won, in the first instance, by a few high-grade minds. A long time-lag is to be noticed before new concepts reach the consciousness of the people, and a still longer period usually elapses before they are absorbed into the thought and behaviour patterns of society.

The scientific attitude towards man and his world began with the efforts of the few. In the course of three or four hundred years it has become an enormously powerful factor in the shaping of human affairs.

The first attempts to inquire into man's nature and place in the universe were influenced by prevailing philosophical habits of mind, and were therefore mainly subjective in character. Then, with the arrival of Christianity, man was invested with certain attributes of body and mind which it was impious to question. With the ecclesiastical upheavals of the sixteenth century began a rational approach to human studies. This made possible the formulation of working "laws" underlying natural phenomena. Philosophy and theology were unable to contribute any

substantial aid to this approach because of their manifold conflicts of thought and opinion.

The realization that man could exert some degree of control over natural processes, and by learning to read the laws of nature could use them to his advantage, opened the way to a planned betterment of human life. Man's redemption of man ceased to be merely an ideal and became a reality. Scientific humanism, with its insistence upon man's capacity for self-direction without divine assistance, has derived its strength from the application of reason to the study of human qualities and capabilities.

The present century is witnessing a profound change in the intellectual life of the people. During the past thirty or forty years there has occurred a much closer union between the professional scientist, philosopher, and man of letters, and the ordinary citizen. Through the medium of radio, films, books, and adult education the man-in-the-street is brought into touch with the best intellects of the world. Modern methods of communication have enabled the gifted few to become the teachers of the nation.

The popular desire for knowledge is to-day very great. It is based not upon idle curiosity, but upon a deep-seated and growing realization of the power of knowledge, and of its intrinsic value as a humanizing and a satisfying ingredient of life. The remarkable popularity enjoyed by all kinds of simply and clearly written books covering almost every branch of literature, philosophy, science, and art, can only mean that the quest for knowledge is passing from the hands of the academicians to the plain man.

There have been times in the history of mankind when deliberate attempts were made to deprive the people of their intellectual heritage. Book-burnings, restrictions on secular education, penalties on the dissemination of certain kinds of information, have at one time or another been employed by obscurantists, religious zealots, and others with vested interests to preserve.

Hindrance to impartial thought is by no means absent from our own lives, although much less obvious (therefore possibly more dangerous) to-day than in earlier periods of our history. Because of this, a considerable body of free-thinking men and women are engaged in the work of bringing the raw materials of creative thought within the intellectual and financial reach of the common man.

It is no small part of the function of education to acquaint successive generations of men and women with their intellectual heritage, to enable them to draw upon the capital of thought accumulated for them by the great thinkers of the past. It is also the function of education to teach and encourage the young to think for themselves, and thus to deal rationally and constructively with the manifold forces which will influence their lives.

Each year brings with it an enlargement of the field of human understanding concerning the nature of man. Yet this progress seems only to sharpen our awareness of the essential mystery that surrounds him. To this sense of the unknown the reaction is not infrequently one of despair in face of the apparent hopelessness and futility of the human quest. It is just there that we need to strengthen our resolve and endeavour, for to relinquish the search would be to sink back into another Dark Age.

It may be that man requires more guidance in facing up to the ever-present mystery of his being than he does in grasping the established and known facts about himself. It must be frankly recognized (a) that time is needed for the solution of any problem, and (b) that in any age or period there are technical and intellectual limitations to the progress that may be achieved in any particular field of inquiry. Enlightenment often comes, not with the initial discovery of simple facts, but with the later unfolding of a relationship between them.

One of the most valuable results of twentieth-century scientific thought has been the unification of

the several departments of research the central concern of which is the human organism. Anatomy, physiology, psychology, pathology, sociology, and education have points of contact in common interests. Literature, art, ethics, and religion, once splendidly aloof from the grosser attributes of physical man, are beginning to appear as aspects of human nature with roots that go deep in the organic processes of life.

There is often levelled at science the charge that it has evolved an artificial picture of man as a soulless collection of chemical and physical mechanisms originating in the blind forces of nature, and that it encourages men and women to believe that the things which science can tell them about their species and the world in which they live are the only realities.

Almost the last broadcast address of the late Dr. William Temple dealt with this particular point. He deplored the common attitude towards scientific knowledge and mastery of the physical world that is expressed in the feeling that nothing exists beyond the domain of fact and experience that science explores. The purpose of science, said Dr. Temple, is to observe and bring together facts, and from their relationships to formulate the laws of nature. Against this the purpose of *revelation* is to make known the character and wishes of God, and man's relationship to Him.

The theologian thus resists the implications and encroachments of science by postulating a field of reality which lies outside and for ever beyond the reach of technical, objective inquiry. Such a realm of the spirit is easily imagined; indeed, it is through the exercise of man's imaginative faculty that the whole elaborate idea of his spiritual quality has been built up. We must not forget that it has been the fundamental achievement of scientific thinking that it has guided the human mind along the path of a rational approach to the ordinary, every-day problems of living in a manner which no direction by religious authority has ever equalled. If the impact of science upon man's attitude towards his own species has resulted in a

radical change of viewpoint, that change must be accepted as a significant phase in intellectual evolution. To regard it as a sign of degeneration is merely futile. In fact, all too frequently the first signs of youthful rebellion against religious orthodoxy are contemptuously dismissed by spokesmen of the Churches as expressions of the desire to appear worldly-wise and in the fashion.

Future trends in the study of man will no doubt follow the broad lines already established. These have been briefly indicated in the preceding chapters of this book. Analysis must inevitably continue as the source of new data. The scope for further advance in the study of man's body is limited on the anatomical side, but there remains on the physiological and psychological sides a vast field of research. Advances here will, in all probability, be concerned with a more detailed understanding of brain activity and an interpretation of special mental states such as are associated with ecstatic and mystic moods, asceticism, æsthetic feeling, etc. Researches of this kind will be likely to make contact at various points with those of the parapsychologists who, as we have seen, are exploring, among other things, the peculiar phenomenon of extra-sensory perception.

As regards the sociological field, sociology must still be reckoned to be in the formative phase of its career. Its sphere of interest is an extremely large one, and what its ultimate positive contributions to the life of man will be may not, at present, be exactly defined. Its comprehensive nature, together with the inherent looseness of its research methods, give it a speculative rather than a strictly scientific temper.

As for the development of an effective synthesis of the "whole man" out of the truly vast collection of facts, concepts, and theories which has accumulated through centuries of scientific, philosophical, theological, and artistic analysis, such a synthesis would seem to be a task for the great thinker, who must combine the mental outlooks of the scientist, philo-

sopher, and artist. It would bring man into relation with his universe; it would embrace the diverse aspects of his bodily, mental, social, and religious qualities. Separate studies of man can do no more than provide the raw materials, so to speak, for the construction of broad generalizations concerning the nature and destiny of the human species.

It is unlikely that any such intellectual synthesis, if undertaken, could achieve a state of completion. We have as yet but a feeble grasp of the human organism and its potentialities. We are acutely conscious of the fact that the frontiers of knowledge are constantly shifting. Vast new tracts await exploration. We may perhaps dimly visualize them, but until our perceptive powers have either become naturally more sensitive, or have been still further artificially extended by mechanical devices, we shall not set foot upon them.

We may feel that the time has come to embark upon the construction of some basic and comprehensive system of ideas acceptable to all shades of thought and reasoning, a kind of rational scheme of knowledge wherein the physical, mental, and social attributes of man's nature shall be adequately expressed.

Yet this must be achieved through the human mind, and if it be true that, as Dr. Emanuel Miller suggests, "to-day we are little more than clever adolescents toying with the intelligence of men yet stirred by the emotions of childhood," one is driven to wonder what qualifications it at present has for the execution of so difficult a task. It may be that humanity will have to wait upon the further evolution of mental powers before there will arise a community of men to whom the true nature of man's being becomes not merely a vision granted to a few brilliant minds, but a vision common to all, in which all are nurtured and brought to a full measure of understanding.

APPENDIX I

READING GUIDE

To assist the reader who wishes to follow up for himself any of the topics dealt with in this book, the following works are recommended. The classification is not rigid and is only for convenience.

PART ONE

- Baker, A. E. *Science, Christianity, and Truth*. Eyre & Spottiswoode. 1943.
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- Davidson, D. *Men of the Dawn*. Watts. 1944. (2nd Edn.)
- Drew, J. *Man, Microbe, and Malady*. Pelican. 1940.
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PART FOUR

- Bartlett, Ginsberg, etc. (Editors). *The Study of Society: Methods and Problems*. Kegan Paul. 1939.
 Bonger, W. A. *Introduction to Criminology*. Methuen. 1936.
 Bourne, A. *Health of the Future*. Penguin. 1942.
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 Maguinness, O. *Environment and Heredity*. Nelson. 1940.
 Newman, Sir G. *Health and Social Evolution*. Allen and Unwin. 1931.
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 Raglan, Lord. *How Came Civilization*. Methuen. 1939.
 Rhodes, H. T. F. *The Criminal in Society*. Drummond. 1939.
 Roberts, M. *Bio-Politics*. Dent. 1938.
 Robertson, A. *Morals in World History*. Watts. 1945.
 Wright, F. J. *The Elements of Sociology*. L.U.T.P. 1942.

PART FIVE

- Allee, W. C. *The Social Life of Animals*. Heinemann. 1938.
 Carrel, A. *Man: The Unknown*. Hamish Hamilton. 1936.
 Childe, V. G. *Man Makes Himself*. Watts. 1941.
 Dorsey, G. A. *The Nature of Man*. Harper, London. 1927.
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APPENDIX II

SUBJECTS FOR THOUGHT AND DISCUSSION

1. "Nothing is more calculated to shock people than common sense applied to long-established but unexamined beliefs." (Kenneth Matthews.)

2. "Science teaching should begin, not with a mythical body in rest or uniform motion, but with the human body." (J. B. S. Haldane.)

3. "Man seems by preference to think of himself as if he were outside the universe rather than a part of it." (W. A. White.)

4. "The next great task of science is to create a religion for humanity." (Lord Morley.)

5. What are the characteristics of the scientific approach to Man's nature?

6. What is the evidence upon which men base their conclusions concerning the origin and purpose of human life?

7. In what ways has the microscope contributed to human progress and welfare?

8. What examples are there of co-operation that recognize no national boundaries?

9. What are some of the important problems that must be solved if man is to exercise greater control over his environment?

10. Why must the twentieth-century community assume responsibility for the health of its members?

11. Contrast the problems of living which are associated with primitive man and with civilized man.

12. In what ways does the organization of man's society differ from that of other social animals?

13. In what ways may the application of humanitarian principles hinder human progress?

14. What factors have been responsible for the development of the materialistic attitude towards man?

15. How did man's interest in health help in the development of our natural sciences?

16. Upon what grounds may it be said that *research* and *education* are both essential to the progress of mankind?

17. What superstitious beliefs and practices are in operation to-day? What factors seem to be responsible for their persistence?

18. "Science has helped to free man from unnecessary fears." Do you agree?

19. Why is it that a study of inheritance in lower animals

can provide useful information concerning the same process in man?

20. The eugenics programme includes research, education, and legislation. What factors may help and hinder these three projects?

21. Eugenics measures include health certification, sterilization, and immigration control. What advantages or disadvantages may be attached to them?

22. Why does the far-sighted employer give his employees good working conditions and good wages?

23. Man's constructive and progressive activities are frequently weakened or hindered by destructive and retrogressive forces. What are these forces and what are their sources?

24. What is implied in the popular distinction between man's *animal nature* and *spiritual nature*? What justification on objective grounds is there for the distinction?

25. To what extent is it true to say that the religious views of the adult are determined by upbringing and early experience?

26. What factors may contribute to a religious "conversion"?

27. In a general way the fundamental problems of to-day are like those of the past. What are these problems?

28. Civilization has replaced natural conditions of life by artificial ones. What advantages or disadvantages have accrued to man as a result of this?

29. "Humanity has but three great enemies: fever, famine, and war; of these by far the greatest, by far the most terrible is fever." (William Osler.)

30. "Every new idea demands two things: the power to think it and the courage to express it." (Stefan Zweig.)

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